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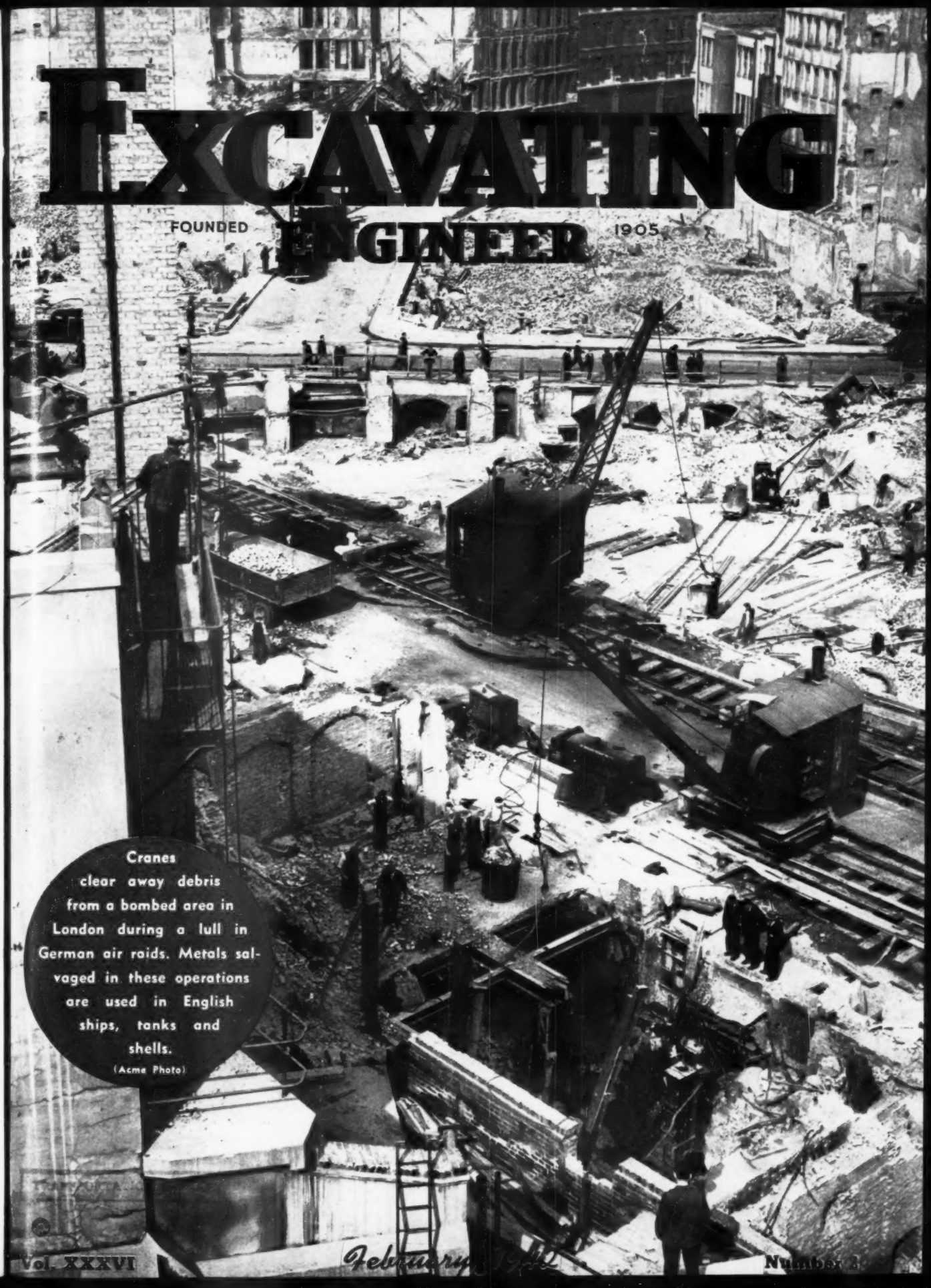
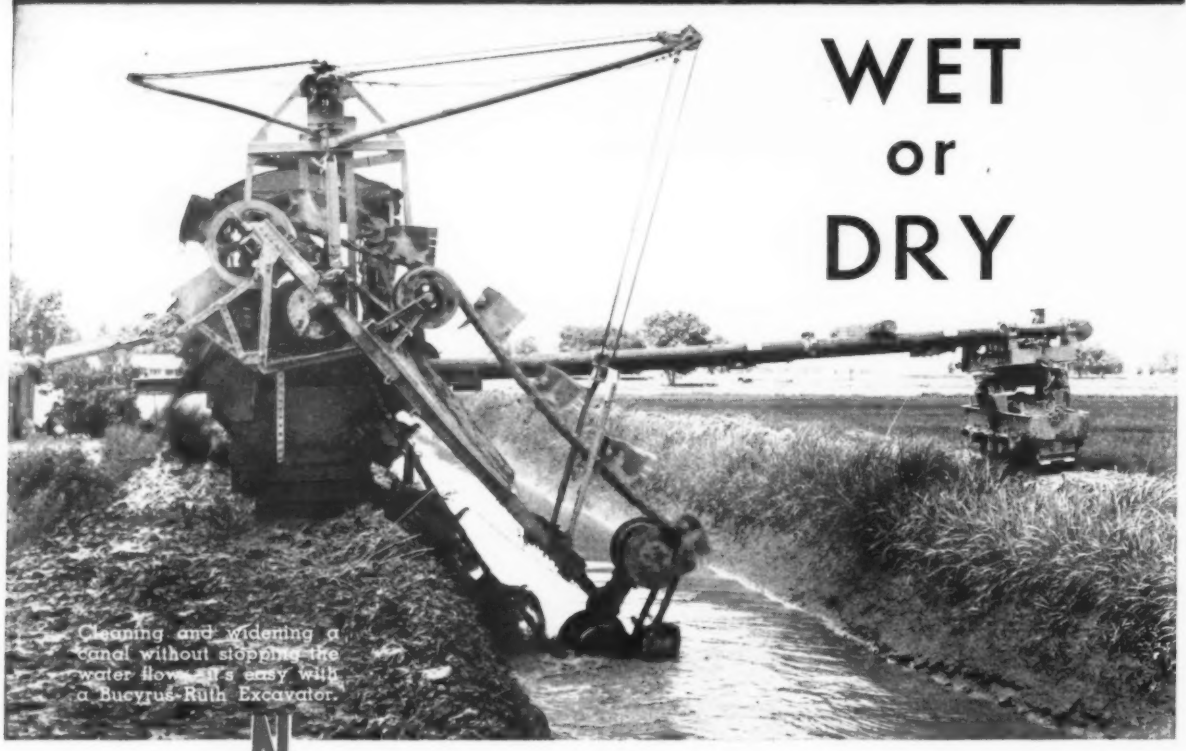


Cranes clear away debris from a bombed area in London during a lull in German air raids. Metals salvaged in these operations are used in English ships, tanks and shells.
(Acme Photo)

Vol. XXXVI February 1942 Number 2

CLEAN YOUR DITCHES

WET or DRY



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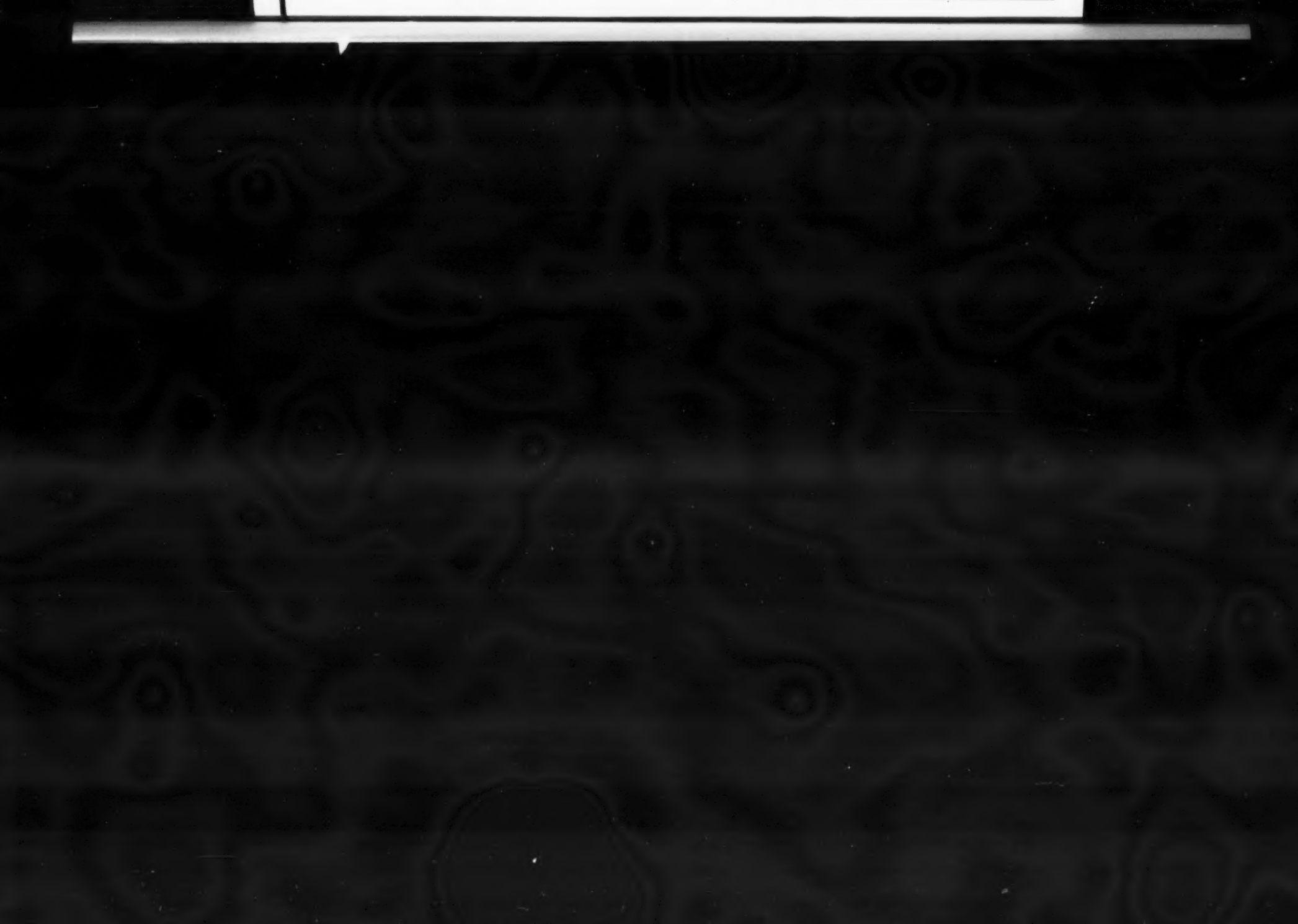

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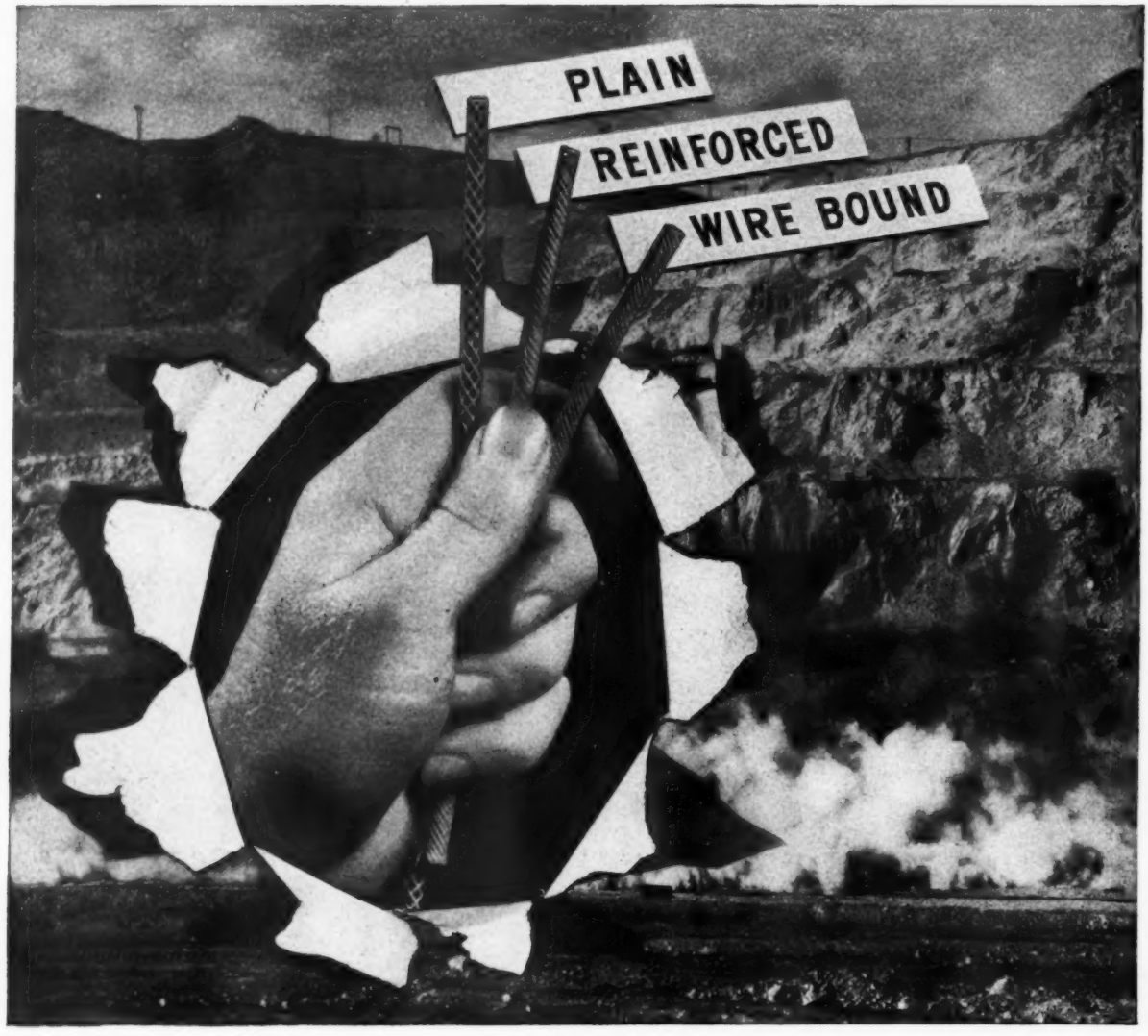

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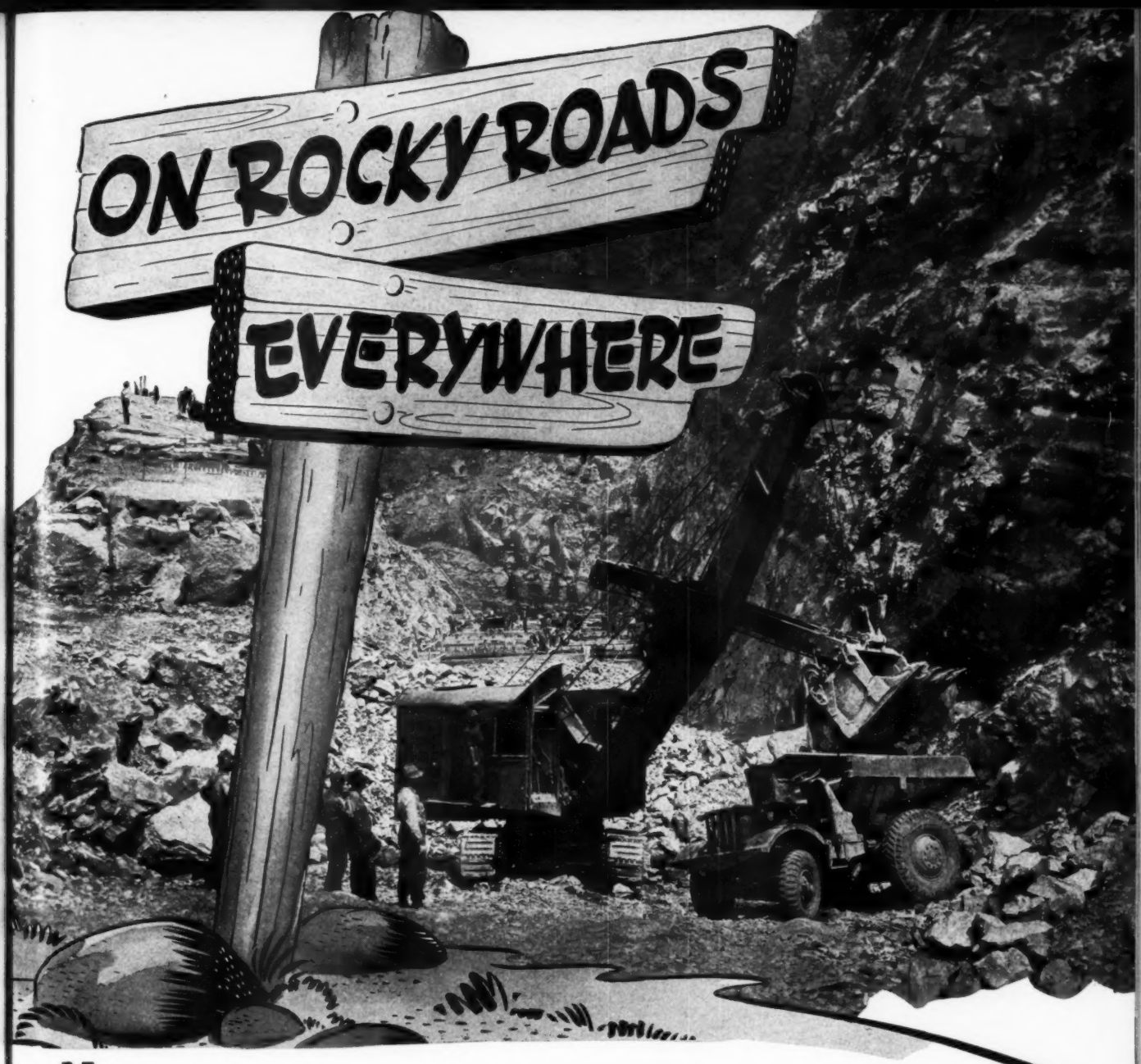

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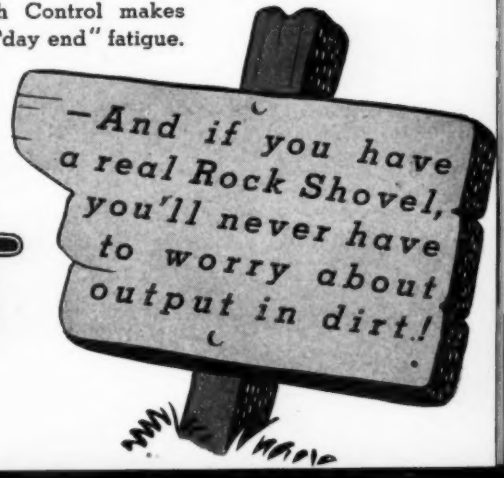

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Colorado River Reservation Indians fight an irrigation battle with the mighty Colorado, using modern power shovels and tractor drawn scrapers to construct an $11,000,000 flood-proof canal system for their Arizona reservation

By R. P. DAY

PICKING UP a map of Arizona, you see nearly a fifth of the state covered by Indian reservations. These vast tracts were set aside by the United States Government many years ago to provide for all time a place where the red man could live in peace. Establishment of these reservations under the Office of Indian Affairs of the Department of the Interior was a small gesture of friendship to the original citizen of this continent, the American Indian.

With the aid of technical advice and supervision from Uncle Sam's field service, the red men have come a long way toward rehabilitating themselves. Many of them are extensively educated. You see attractive Indian maidens in Saks Fifth Avenue fashions typing in the reception rooms of the administration buildings. Young bucks laugh as heartily at Esquire cartoons as you or I. When they work on their reservation today they do so with elaborate geological knowledge and modern methods. When a redskin bites the dust in 1942 the chances are that he is handling the controls of a tractor or power shovel.

To illustrate the point, let's visit the Colorado River Indian Reservation in western Arizona, 25 miles below Parker Dam. Under the direction of the Indian Service a big canal is under construction downstream from Headgate Rock Dam. Completion of this canal will increase potential irrigation capacity from 5,000 to 100,000 acres. It will jump the productivity of the reservation twenty times.

That section of Arizona has a long, colorful history. It is a story of an uphill battle with the relentless Colorado River, whose ebb waters were the very lifeblood of the district and whose muddy floodwaters spelled death, destruction and famine. Until Boulder Dam was built the river raged unchecked toward the sea, occasionally overtopping its low banks in the flat reaches below Grand Canyon. Tapping the river for an irrigation supply was notoriously risky business.

Early Canal Plans

The district was discovered and explored by the great Spaniard, Alarcon, in 1540. With the exception of a few itinerant Jesuit priests, very little was established in the way of civilization for 323 years. In 1863 Colonel Charles D. Poston, superintendent of Indian affairs, recognized the need for a developed system of irrigation.

• Two shovels, a Kochring and a Northwest, load out tough basalt during the early excavation at Head Gate Rock Dam. This dam will control the flow of the Colorado River into the new canal system.

THE MODERN MANNER

• Powered by Allis-Chalmers tractors fore and aft, a Bucyrus-Erie 13½-yard scraper picks up a load of gravel in the canal cut. Note fill on bank of Colorado river in the background.

With A. F. Waldemar, a civil engineer, he formulated plans for a canal. Colonel Poston later became Arizona's first territorial representative.

Actual construction was delayed four years until 1867, probably because of the Civil War. George W. Dent, superintendent of Indian affairs, whose lot it was to start the job, completed five miles of canal that year. But when the first water was turned into the canal in July, 1870, the builders found that they had not reckoned respectfully enough with the river. Floodwaters running down the canal could not be controlled and the irrigation system washed out. In 1872 the canal was extended three miles upstream to Corner Rock and a head gate placed. Head Gate Rock was thus named. But there were tunnels in the three mile extension. The mighty Colorado again surged through and caved in the tunnels, causing that method to be abandoned.

Following a discouraging period of water wheels and other various irrigation methods, a steam pumping plant was erected in 1912. Steam was replaced later by diesel engines and the pumping plant functioned satisfactorily. Its capacity, however, was limited to the irrigation of only 5,000 acres. Since a total of 100,000 acres were potentially irrigable it was desirable to replace the plant by some kind of a gravity flow canal system of increased capacity.

With this result in view, engineers of the U. S. Field Service began several years ago to draw up plans for a comprehensive system which would not fail. Even though the vengeful river had been tamed to some extent by dams constructed upstream from the reservation, the Indian Service engineers still had a wholesome respect for the stream. The water still fluctuated with varying velocity as the discharge changed at Boulder and Parker Dams. Daily flows of 10,000 to 15,000 cfs were not uncommon and there was always an outside chance that as much as 120,000 cfs could come down the river.

Head Gate Rock Dam was, therefore, built to divert part of the stream into the canal of the new system. Massive and elaborate, the concrete structure was keyed solidly into Head Gate Rock, a conspicuous lava capped butte of Temple Bar conglomerate extending from the Arizona side well out into the river. The dam, while it is to be used primarily for irrigation and land development, provides for future hydroelectric installations if the river degrades sufficiently during the coming years.

At the present time the Colorado River Indians in company with a few white men are working on the important gravity flow canal downstream from the Head Gate Rock Dam. The 1941-1942 appropriation calls for the excavation of a million cubic yards of material including the drilling and construction of 420 feet of reinforced concrete lined tunnel. This year's $560,000 item is an important part of the $11,000,000 system.

The project is split up into three interesting major phases, all of which are being conducted rapidly and efficiently. There is the main excavation for the canal, involving a cut 75 feet deep dug by tractor drawn scrapers. Then there is

• A hard conglomerate section of the canal cut receives the attentions of the Northwest (foreground) and Koehring shovels.

the slow, tedious, dangerous tunnel excavation, necessary to carry the canal under the Santa Fe Railroad and Highway 72. The third phase is the placing of reinforced concrete in the excavated tunnel.

Geologic Structure

To appreciate the difficulties encountered, it may be well to dig into the geology of the district where the canal and tunnel are being dug. Three geologic periods are in evidence; pre-Cambrian, Tertiary and Quaternary. The Tertiary and Quaternary periods are more prevalent and include exposed formations of Chemehuevis gravel, basalt, ancient lake bed, conglomerate and soft sandstones. Alluvium exists along the river banks as washed, round material from the river tributaries.

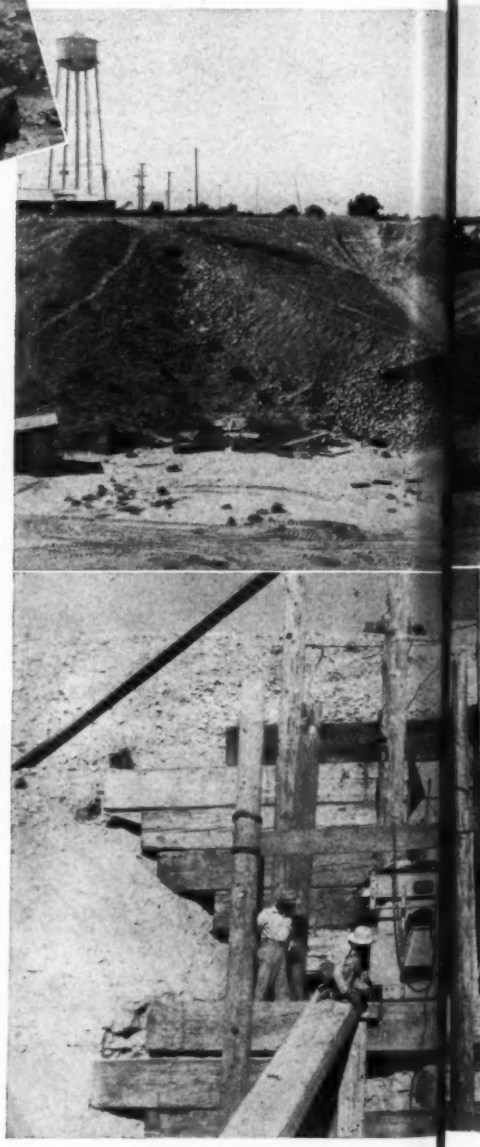
Let's begin at the surface and go down from there. Chemehuevis gravel, a capping formation overlying the whole district, is a well graded material ranging from fine sand to 18-inch diameter erraties or boulders. Underneath that layer is a stratum of ancient lake bed from 4 to 10 feet thick. It is a thinly laminated white to greenish yellow formation, fossiliferous in character, composed almost entirely of lime; tight and hard when wet but loose and crumbly when dry. Fossils suggest fresh water origin.

Temple Bar conglomerate, lying directly beneath the lake bed formation, is an obscurely bedded variety of stony and sandy detritus, such as is generally found in desert alluvial fans. Its particles are strangely angular and subangular, quite unlike the typical river deposits, and are cemented together by iron oxide, calcite and argilacious material. It is usually too hard to remove by power shovels unless it is drilled and blasted. While it is more or less porous, it wears well and is resistant to weather and river erosion.

Igneous basalt flow occurs in a 40 foot thick layer below the Temple Bar conglomerate. It is a fine grained, dark, hard rock, varying in stability due to seams and joints of calcite. Underlying the basalt flow to an unknown depth is a second layer of Temple Bar conglomerate.

All of these formations have been twisted and turned about in subterranean upheavels until most varieties of the material are visible on the surface of the job. Excavation men, and particularly those familiar with these Arizona formations, will recognize at once the difficulties in removing it.

The canal follows a southerly course within a few hundred feet of and parallel to the Colorado River. This route was picked with a purpose. Had the canal been carried farther inland it would have had to cross watersheds draining parallel to the river, and siphon structures or "water bridges" would have been necessary. By holding the canal near the river all the Indian Service encountered was the excavation of a few deep cuts.



• The tunnel excavation is kept free of excess ground water by three Jaeger 40,000 gph pumps.

On those parts of the job where Temple Bar conglomerate was

found it was necessary either to drill and blast, or to break up the material with paving breakers. One Davey 210 cfm air compressor operating three jackhammers was regularly used on canal excavation. Holes were drilled to grade,

• Aggregate necessary for concrete tunnel and open canal lining is prepared at this batch plant built on the job.

using 1½ inch steel. About ¾ pound of 30% gelatin was used per cubic yard of conglomerate. Blasting was unnecessary where the Temple Bar joined up with soft tertiary sandstone.

The remainder of air operated machines were used in the excavation of the tunnel. Included in this list were four Ingersoll-Rand 105 cfm compressors, three heavy paving breakers, four light breakers and three concrete vibrators. Ingersoll-Rand, Chicago Pneumatic, Sullivan and Worthington manufactured the paving breakers, while the vibrators were exclusively Chicago Pneumatic.

A new Lorain diesel shovel, swinging a 2-yard Emco dipper, was used to load broken material to a fleet of GMC dump trucks. Hauls were limited to 500 feet. Excavation was wasted between the canal and the river to form a protective levee. This system of disposal was used in all digging operations.

Scraper Excavation Procedure

A fleet of tractor equipment was brought in to excavate and dispose of the Chemeheuvis gravel portions of the cut. Six Allis-Chalmers HD-10 diesel tractors were hooked up to two Model S-152 Bucyrus-Erie scrapers, a LeTourneau "FP" scraper, a LeTourneau "L" scraper and a Bucyrus-Erie S-90 scraper. One of the HD-10's was detailed as a pusher. One Allis-Chalmers Model "L," one "LO," and an HD-7 were also used as pushers and as bulldozers in grading work.

Indian operators joined up with their white brothers to dig the gravel out of the cuts. Under the personal supervision of big, genial Excavation Superintendent L. M. Armstrong, tractors and scrapers kept up the steady, punishing grind. Loading required 275 feet of travel, both for the S-152 Bucyrus-Erie and for the "FP" LeTourneau scrapers. The 8-yard LeTourneau and the S-90 Bucyrus-Erie usually picked up their load in about 190 feet. The firm, well packed, gravelly material was especially hard to load. Superintendent Armstrong pointed out that here was about as difficult digging as a scraper is ever called on to do.

"Bear in mind," he said, "that the material in the first place is hard for a scraper to dig. We had to get Allis-Chalmers HD-10 tractors because no others of the size recommended by the scraper manufacturers were available. HD-10's are usually considered too small for use on machines having the capacity of the LeTourneau "FP" and the Bucyrus-Erie S-152. But the HD-10's are doing a good job of filling the scrapers and are holding up without excessive repairs."

He might have added that wherever possible the scrapers are loaded down grade to utilize as much of the tractor's weight as possible. The Indian Service keeps excellent cost and yardage figures. In a 26-day month, work-

(*Continued on page 117*)

• Tunnel excavation view showing method of loading truck in pilot cut which is dug ahead of the main operations for convenient loading.

Ventura County Builds a Road

Farm-to-market roads play an increasingly important part in America's highway network. Here's how a typical county goes about building one in California

By FLOYD SUTER BIXBY

IT MUST HAVE made the heart of Don Felipe quicken with pleasure three centuries ago when the king of Spain bestowed upon him a grant to the rich acres of Hidden Valley. For Hidden Valley is located in the center of what is now Ventura County, California. Hemmed in on all four sides by the peaks of the Sierra Nevada range, the valley was an ideal place for Don Felipe to watch his oxen fatten in the lush grasses of this fertile land.

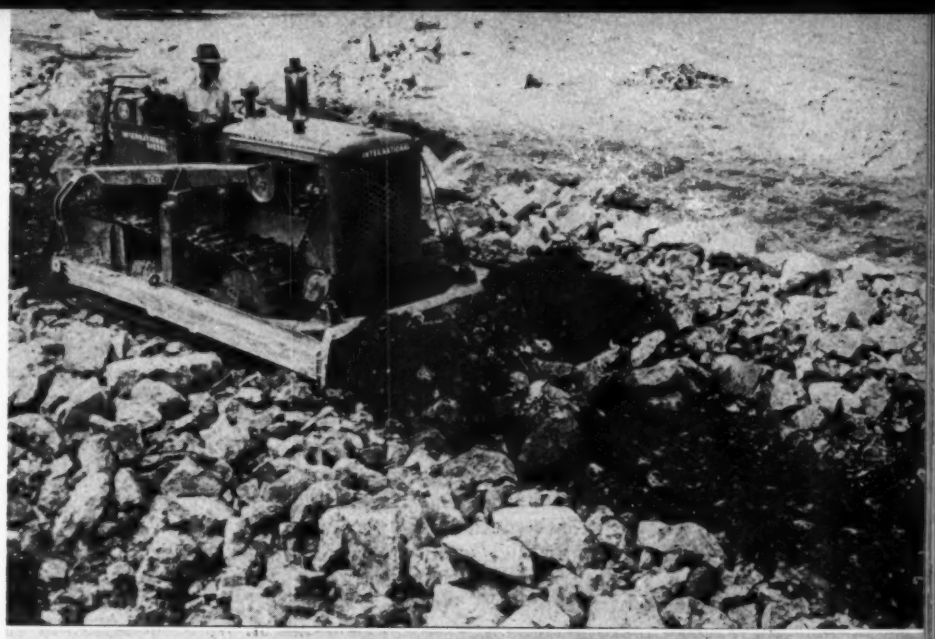
In that early day transportation into the valley was not the problem that it is now. There were passes through the range of mountains; high but nevertheless passable if one's horse was powerful. But as the steed was replaced by the carriage, and as this was supplanted in turn by the stagecoach and the automobile, the descendants of Don Felipe gradually began to realize that road building into the fertile valley would some day pose a problem of major importance.

Well built indeed were those mountains, even though there is scarcely a whole piece of rock left west of the continental divide. Heavy bedded shale of prehistoric origin juts out along the cliffs overlooking the blue Pacific Ocean. Blue granite, gray granite, porphyritic granite and all the other different species of this stone underlies the area and is present in boulder form scattered over the mountainsides. Tertiary sandstone, of more recent origin, lies in great heavy beds to bar the way of present day excavating machinery. Massive deposits of conglomerate with some cementation present are found high up on the mountains where they have been pushed by a subterranean force.

In the midst of this country rich in historical lore, the County of Ventura is building a highway from the Camarillo State Hospital to West Portrero Road. This route will eventually form a part of the cutoff system between U. S. Route 101 across the mountains through Hidden Valley to U. S. 101 carrying San Francisco traffic into Hollywood and Los Angeles over Ventura Boulevard.

Not many roads enter Hidden Valley. For in spite of the fact that excavating machinery of the present day will dig material almost impossible to remove not so many years ago, engineers still lay off from wrestling with the tenacity of the Hidden Valley mountains. They know the mountains are tough and they simply don't tackle anything there which isn't necessary.

This $91,000 job being what it was, however, the county engineer gave R. W. LeFever, the Moorpark road supervisor, the word to proceed with the job.



• Left: Ventura County's Bucyrus-Erie ⅜-yard shovel makes a cut, loading out to trucks that carry the material to the low spot in the background where a tractor is grading the fill.

Involved in the new road were some 100,000 cubic yards of excavation, all balanced between cuts and fills. Remodeling this part of the old West Portrero Road included excavation, grading, earth compaction, and the placing of some 30-inch corrugated metal pipe for drains. The variety of material ran all the way from clay to heavy bedded shale, including some soft, friable sandstone.

On either side of the road to be widened was a heavy growth of brush and light trees up to 3 inches in diameter. This vegetation was present wherever the rock was covered by any clay or silt overburden. It had to be removed and burned before any actual excavation could be accomplished.

A new International TD-14 TracTracTor, on which a Bucyrus-Erie Bullgrader was mounted, was brought in for this work. The cutting blade of the Bullgrader was 30 inches high, giving ample blade surface to carry a good heavy load of brush to the waste pile. Stripping operations were generally conducted progressively from one end of the job toward the other, building the brush into convenient piles.

Small brush, too minor to cause voids in the fill, was pushed on in with other material to form a part of the base for the new road.

One of the features about the Bullgrader was the ease in which the blade could be angled from the straight bulldozing position. The blade, mounted on a central rocker control, changes to either

(Continued on page 122)

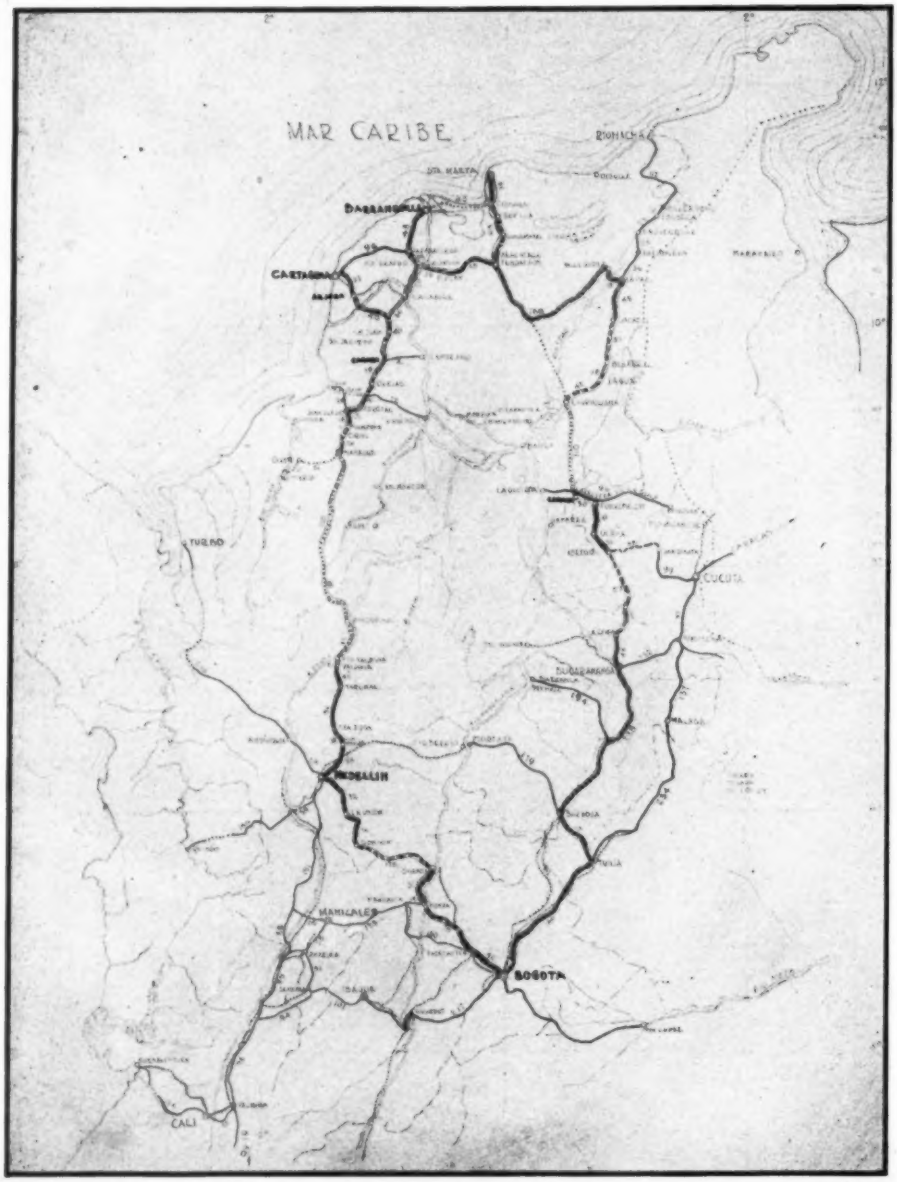
• Top: Mounted on an International TD-14, this Bucyrus-Erie Bullgrader grades a hauling road in the county quarry. Center: Ventura keeps its road surfaces shipshape with this Gardner mixer hooked on a Bullgrader - equipped tractor. Bottom: An Allis-Chalmers Speed Patrol grader mixes hot oil into a county road.

Highway Construction I

Experiments with modern excavating equipment have encouraged this South American country to enlarge its present highway system

AT THE PRESENT time Colombia has taken a major step forward in the construction of highways. In the past two years the department governments with the cooperation of the national government has devised and put in operation a method of securing heavy industrial equipment for use in road construction. At the present time they have two contracts in progress using this method, namely, the construction of the highway from Arjona to Carmen, and from Barranquilla to Cartagena. The contract for the construction of the road between Arjona and Carmen has been awarded to Parrish & Company of Barranquilla, and the section from Barranquilla to Cartagena is under construction now by the Winston Brothers Construction Company.

Due to the limited amount of construction work in Colombia, it has never been practical for contractors to purchase their own equipment. All the road construction work in this country has previously been done by hand, which naturally results in a very small mileage per year at a rather expensive cost. The national and state department governments realized that, if the Colombian road program is to advance and keep up with the trend of the times, mechanized methods of road construction must be instigated. To accomplish this the Colombian government has devised a method in which they purchase the equipment which is later rented to the various contractors on the different jobs.



• The ultimate goal of Colombia's National Government is to connect the federal capitol of Bogota with the northern coast through Cartagena and Barranquilla.

"Cost Plus" Awards

A detailed manner in which this is carried on is as follows: a section of road is considered and various contracting concerns are consulted and terms are negotiated on which this road will be constructed. This usually results in a cost plus basis with the government furnishing the equipment which is paid for at the rate of so much per month based on a depreciation charge, the contractor furnishing all maintenance, fuel, etc. There is also a clause in the contract which binds the contractor to a certain limit as to the expense, and if a saving is made over this fixed limit, the difference is divided between the contractor and the government. From this point the contractor decides what type of equipment is required for this specific piece of construction, and if such equipment is available in the yards or warehouses of the various departments this is assigned to them. If not, new equipment is requisitioned through the Obras Publicas of the various state departments which in turn present it to the national department where a central purchasing agency negotiates for the purchase of this equipment. After the completion of this job, it is planned

Colombia

that this equipment will be turned over to the various departments in A-1 shape, and they then can be used on other jobs by the same contractor or other contractors depending on who is successful in negotiating the business for future work.

The ultimate goal of Colombia's National Government is to connect the federal capitol of Bogota with the northern coast through Cartagena and Barranquilla. The accompanying map shows the route this road will follow and gives some magnitude of the project. The terrain over which this road must traverse is very mountainous in sections and requires some heavy grading and good sized bridge structures. A well drained grade with the best possible alignment is the goal of present construction plans. In flat sections the alignment is very straight but in the mountainous sections although the grades are all fairly gradual, the curves are very sharp due to the fact that the road must approximate the natural contour of the terrain and follow the mountain sides. The road is surfaced with a limestone base bound with a cut-back asphalt later sealed with a heavier asphalt and covered with hard rock chips to form a long wearing surface. The Arjona-Carmen section of Colombia's highway system presents some very interesting features. This job consists of 157 kilometers (97.55 miles) which involve approximately 650,000 cubic meters (850,135 cubic yards) of earth. The cross section of the road will have a 7-meter (22.96 feet) road bed with a 5-meter (16.40 feet) asphalt surface.

• **Above: Cutting a road through Colombian jungle, this International-mounted Bucyrus-Erie Bullgrader proves its efficiency over slower and more costly hand labor methods.**

• **Below: Modern road building equipment is originally purchased by the Colombian government and rented to local contractors. Here another Bucyrus-Erie Bullgrader grades a new road across the face of a steep jungle slope.**

Modern Equipment Used

The equipment on this job is all new and consists of three International 75 h.p tractors, two Bucyrus-Erie 10-yard scrapers, two Bucyrus-Erie cable operated Bullgraders, one Northwest ¾-yard dragline, one Northwest ½-yard shovel, twelve Chevrolet trucks, two Chevrolet pickup trucks, one Chevrolet car, two rollers, an Austin-Western and one Galion, one rock crushing plant, one asphalt distributing truck, air compressor, welder, cement mixers, pumps, and other miscellaneous equipment.

This job is being carried out by the Parrish & Company of Barranquilla, Colombia, under the personal direction of Robert A. Pratt, engineer and general superintendent. The project is being carried on entirely with local labor under the direction of Mr. Pratt, his engineers and foreman. The labor supply is furnished by the surrounding territories with most of the technical and mechanical help being brought from larger cities.

To provide housing for the men, a construction camp was established for the office force, equipment operators, helpers, and laborers. The camp is located at a central point on the job and is constructed of wood, complete with electric lights, showers, modern sanitation, and a drinking supply which is tapped from the Cartagena aqueduct. As the work progresses the camp site will be moved as close as possible to the scene of activity. An interesting feature of the job is a swampy section between Arjona and Sincersn. In this section it is necessary to cross the Canal Dique which is one of the old mouths of the Rio Magdalena and which is now kept open for navigation by small craft. This section is to be constructed with a ¾-yard dragline with a 45-ft. boom which is to be used for a portion of the way of an old railroad fill that

(Continued on page 122)

How to Get the Most Out of

Tire rationing laws make it important that you conserve your tires. Here are some "do's" and "dont's" of proper usage that may add one-third to your tire life

By JOHN R. MARCY

SOME TIME AGO, before the present tire rationing laws, a tire dealer troubled with stiff competition secured a contract to furnish the tires used on a heavy construction job on a mileage basis. He guaranteed the average mileage for tires used on the job at a price considerably under his competitor's. Above that the contractor agreed to pay him a bonus for every mile.

It was a good deal for the contractor whether a tire went over the average mileage or not. Either way it would cost him less per mile. It was a good deal for the tire dealer provided he could get enough extra mileage from the rubber. He did it by putting a service man on the job who saw that the tires received proper care.

As a matter of fact the dealer was not gambling. He was simply putting to practical use a fact recognized by tire men everywhere, namely, that the service of any tire can be increased about one-third by proper treatment.

The point is that you don't have to be a tire dealer to put this into practice. There is no reason why anyone can't get a third more service from his tires if he wants to, and with rubber playing an important part these days in the nation's war effort, saving rubber is a patriotic as well as an economic duty.

Because of this, the "do's" and "don'ts" of proper tire care have assumed new importance.

Chief Tire Trouble Factors

Three chief factors are responsible for most tire trouble: improper inflation, overloading, and speed, and in all of these friction heat plays a part.

At 160 degrees a tire wears five times faster than at 40, and when rubber temperature reaches 250, it enters a clearly defined zone of trouble. This is why tires wear out twice as fast in summer as they do in winter.

Under-inflation is the most frequent offense against good care. Its effects are serious, causing ply separation, side-wall breakdown, and heat generation. If the recommended pressure of your tires is 40 pounds, and you run them at 32, a degree of under-inflation quite common, you cut down the normal life to 70%, or about one-third, and the lower they get, the poorer the service. Find out what the correct pressure for your tires is, and check them once a day at a regular time.

While the pressures recommended by the manufacturer are usually satisfactory, it must be remembered that they are based on average conditions, and that these conditions may vary with load, surface of hauling road, and seasonal temperature. There is a considerable margin of safety above the normal pressure, and the poundage that gives the least friction heat under your particular operating conditions is the most efficient one. The way to determine this accurately is by means of a special tire thermometer applied to the rubber during actual operation.

Over-inflation is less common, and so less of a factor. But it has been responsible for a good deal of premature wear and blow outs because it puts constant strain on the casing, and causes rapid wear on the center of the tire.

No matter how regularly you inflate your tires, a leaky valve will turn your trouble to naught. Keep out dust and foreign particles by the use of tight valve caps

• Tires play a paramount part in the maintenance of the nation's secondary road system. Here two black top spreaders and a road grader work on a Genesee County, Michigan, road.

Your Tires

and you will eliminate most of the valve trouble. Remember, also, to blow off dust from the valve tops before inflating, so that it will not be blown into the stem.

Overloading is a practice so common that it is almost the rule. Sometimes trucks are overloaded deliberately because the owner thinks it profitable to do so, but before you adopt such a policy you'd better check against the cost in reduced tire service. To a certain extent you can get around the effect of overloading by oversizing, but in general, if you overload you'll have to expect less tire mileage, and the table below will give you an idea of how much, both from this cause and from under-inflation.

As may be seen, the greater the load, the less the service, and the reverse is also true. Considering only the factor of weight, if you carry a 20% overload (second column in the chart) you decrease the normal service 30%.

Since a larger tire has a greater load capacity, oversizing is, within limits, the same as decreasing the load. As a general thing oversizing is always a good practice. Your tires will cost a bit more, and your power on hills will be slightly reduced, but you'll be money ahead in the end.

You can overload without adding weight, too. On vehicles equipped with duals, overloading can result from excessive weight being thrown on one tire. Keep off the crown of the road when it is curved, don't match a new tire with a worn one, and keep both duals inflated to uniform pressure. The place for worn spare tires is on the rack, not on the wheels.

Wobbly wheels are responsible for the hills and valleys in your rubber that soon ruin the best of tires. Wear on one side of the tread is caused by poor alignment, and when you consider that a tire one-half inch out of line is dragged sideways 87 feet in every mile, it's easy to see why. A single worn spot is usually caused by a brake drum out of round so that undue breakage is applied to a single point. Replace worn bushings, keep your front wheels properly aligned, and watch the wear signs.

• Scraper tires must take plenty of rough usage in performing every day job duties. It will pay you to lengthen their service period by a daily checkup.

Speed Cuts Tire Life

Don't forget that speed cuts down tire life. Normal service decreases above 40 mph, and the faster you go, the greater the reduction. At 70 mph you get only half normal service. Load is a factor here also, and if you must go fast you'd better oversize. You have no right, though, to expect good tire mileage at high speeds, any more than you have to expect good gas mileage.

Step over and examine the pavement sometime after a heavy-footed driver "takes off." If you look closely you'll find black rubber dust on the concrete. A tremendous amount of friction is developed in starting which, if applied suddenly, is borne by a small section of the tread. Many drivers reduce the service of their tires one-half and even more from this cause. When you dash up to a stop and apply the brakes suddenly you do the same thing, wearing out both tires and brakes needlessly. In this day of high-speed motors, these two poor driving practices are becoming increasingly common.

More depends on the type of tires, especially in regard to tread design, than the average user suspects. The different designs are not there for the sake of variety or because they make a pretty track. They are the result of careful field and laboratory tests which have determined the best design for every service condition. Find out what the prevailing condition is under which your tires must serve, and then consult your dealer as to the tread best adapted to it.

If you have many stops and starts, get a tire with a thick tread, for that's where your rubber goes, stopping and starting.

Tire Overload and Inflation Efficiency Chart

	Normal Load	20% O. L. or 80% infla.	40% O. L. or 71% infla.	60% O. L. or 64% infla.	80% O. L. or 56% infla.	100% O. L. or 45% infla.
OVERLOAD						
INFLATION	100% infla.					
SERVICE	100% mi.	70% mi.	50% mi.	39% mi.	31% mi.	25% mi.

• Rubber tires are necessary to keep much of the industry's equipment rolling. Proper care may lengthen their service by as much as one-third.

On the other hand, a thick tread generates more heat in rolling than a thin one, and so is subject to more wear at increased speeds. Therefore, if you make long runs with few stops and starts, choose a thin-ribbed tread. For sand, a chain block is best. Heavy "lug" designs have been developed for rough rock travel. There is also a tread design on the market now which permits a thick tread which will not heat. While this tread will doubtless come into wide use, at present few tires have it.

Before tire rationing brought these methods of tire rejuvenation into popularity, many people questioned the economy of recapping and retreading. A few years ago this type of repair probably wasn't practical, but today improved methods and materials have made it a reliable means of extending tire use. Furnishing your own casings, however, is no surety for you. It is impossible to tell whether or not a casing is sound merely by looking at and feeling it. As far as you can tell it may be perfect, but nevertheless have ply separation. Always put the casing on a spreader. That will show up any defects it may have. Never retread a casing without doing that, scrap it if it shows imperfections.

Consult Your Tire Dealer

There's a great deal to know about tires and the average person can't be expected to have it all under his hat; nor is it necessary, for your dealer can give you the answer to almost any problem which may arise, and is always glad to have you consult him.

But everyone should remember this: a tire is no better than it is treated, and good treatment is the same anywhere for any tire. You'll find below a list of the main points of good treatment condensed in handy form by the technicians of the U. S. Rubber Company, mostly little things which make all the difference between good and poor service. Don't just read them. Practice them, and you'll save yourself not only dollars, but a lot of grief.

General

1. Tire economy means safety.
2. Under-inflation, speed, overload, and sudden stops and starts mean short tire life.
3. Check the cause of uneven tread wear at once and correct it.
4. The A. A. A. alone fixed 8½ million flats last year, most of which could have been prevented by proper care. Check your tires regularly and frequently for cuts, glass, stones, nails, bruises.

Tires

1. Maintain recomended pressures and check often.
2. Do not decrease pressure during hot weather. Ordinary temperature rises affect tire pressure very little.
3. Investigate sudden drops in pressure. First test cores, then look for nails or cuts.
4. Inflate new tires slowly for the first 15 pounds. Stop several times to allow the tube to adjust itself. Bounce the tire or pound with a broad-faced tool.
5. Do not permit cuts to go unattended. Remove tire and have repair made.
6. Rotate the wheel position of tires periodically for long service.
7. Reverse tires showing irregular wear and check for cause.
8. Keep wheels clean and free of rust. Correct dents in flanges.
9. Use rim sizes recommended for tire.
10. Do not use a loose boot in a good casing except in an emergency, and then only to the nearest service station.

Tubes

1. Use a new tube in a new tire.
2. Eliminate buckling or stretching by using the proper size tube.
3. Dust tubes with soapstone before installing.
4. Never try to make a leaky core do a job; replace it.
5. Do not install a tube in a wet casing.
6. Make sure no grease is on the tube before inserting.
7. Clean out all pebbles or loose dirt from the casing before installing tube. A damp rag is handy for this.
8. Make certain valves do not touch brake drums; excessive heat may be transmitted to the tube.
9. Use valve caps at all times.
10. Never place an old cracked flap in a tire.

Highway Service In Africa

The establishment of regular highway passenger and freight service in the near future over the desert road which connects the French ports of Dakar on the Atlantic and Casablanca on the Mediterranean, is reported by the United States Department of Commerce. The route between these two ports is long and difficult and crossing up to now has been very infrequent. Due to a current shortage of gasoline, it is reported that motor vehicles on the Dakar-Casablanca route will be equipped to use substitute fuels.

THE POWER BEHIND THE SHOVEL

IF ALL excavating jobs were easy digging in soft ground, almost any engine would be good enough to furnish power. But when the going gets tough — when you're up against rock or deep frost — then you need "Caterpillar" Diesel Power to lug the load. You can trust it to do its job, regardless of conditions.

Today ALL major manufacturers of shovels, draglines, clamshells and cranes have factory-engineered "Caterpillar" Diesel Power into their products.

Ask your "Caterpillar" dealer for full information about "Caterpillar" advantages and savings.

CATERPILLAR TRACTOR CO., PEORIA, ILLINOIS

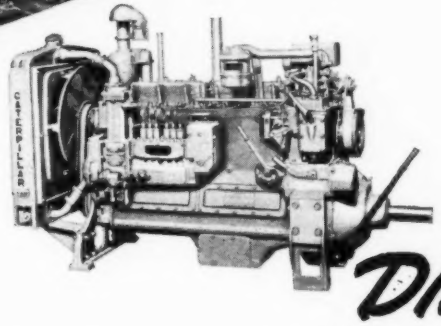
• Ditching on the site of an ordnance plant in Illinois, this Bucyrus-Erie shovel, powered by a "Caterpillar" Diesel D4600 Engine, works in deeply frozen ground, burns only 2¼ gallons of fuel per hour.

Here are some of the features that have made "Caterpillar" Diesel Engines record-breakers for economy and dependability:

• The fuel system, designed and built by "Caterpillar," is an outstanding Diesel development. It requires no operating adjustments. Burning low-cost No. 3 domestic burner oil, a "Caterpillar" Diesel Engine can idle indefinitely without fouling or choking — then pick up its load immediately without faltering.

• Absorbent fuel oil and lubricating oil filters and controlled lubricating oil temperature; "Hi-Electro" hardened, Super-finished crankshafts; "Hi-Electro" hardened, direct water-cooled, chemically treated cylinder liners; and thorough protection against dirt—all contribute to long, trouble-free engine life.

• When repairs or replacements do become necessary, remember that the most complete replacement-parts and service facilities of their kind in the world are always available to keep "Caterpillar" Diesel Engines running at top efficiency.



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CATERPILLAR

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DIESEL ENGINES AND ELECTRIC SETS • TRACK-TYPE TRACTORS • ROAD MACHINERY

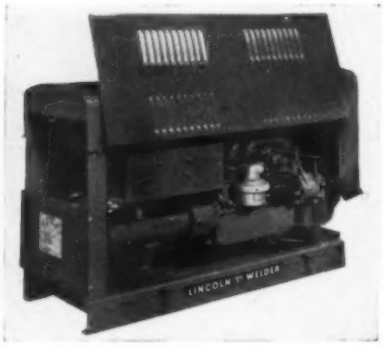
Equipment

you ought to KNOW ABOUT

Arc welder

Manufacturer: The Lincoln Electric Company, 12818 Coit Road, Cleveland, Ohio.

Claims: A new engine driven arc welder which is specially designed for job welding and garage work and which embodies a new system of engine-speed control for maximum fuel economy and minimum engine wear. It is reported the new unit is priced lower than than the average shop would expect to pay for a satisfactory "home made" outfit. Of 200-ampere size and a current range of 40 to 250 amperes, the machine can be used for the welding of light gauge metal, for hard-facing worn parts, or repairing cast iron parts such as engine blocks, etc. Its compactness and light weight make it readily portable and can work in remote locations. The welder is powered by a Hercules



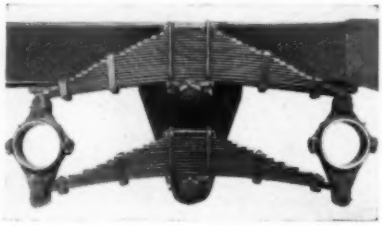
industrial engine equipped with a centrifugal type governor, high tension magneto with impulse starter coupling, and oil bath air cleaner. Weighs 890 pounds (stationary model). Dimensions: 56″ x 37″ x 20″.

Two-axle spring suspension

Manufacturer: Grico Two Axle Drive Company, Detroit, Mich.

Claims: A new patented double trunion spring suspension combining a high degree of efficiency, flexibility and control of torque, has been developed for use with trucks equipped with Grico two-axle drive. This unit is simple, rugged, and provides the maximum in flotation. The new type suspension is very efficient even

For further details about the equipment on this page please write to the manufacturer, mentioning Excavating Engineer.



under extreme road conditions and bad going.

Crushing plant

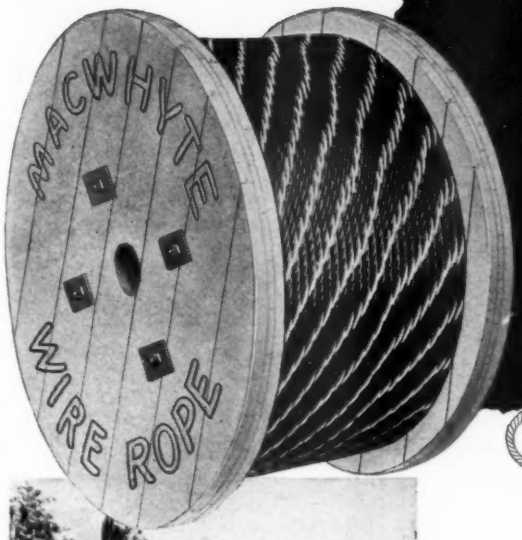
Manufacturer: The Austin-Western Road Machinery Company, Aurora, Illinois.

Claims: A highly portable double unit crushing plant capable of delivering exceptionally large outputs of crushed gravel or stone. The reduction unit is suited equally well for gravel or for quarry service and consists of a 4022 all roller-bearing roll crusher, 4′ x 12′ triple deck gyrating screen and rotary return elevator all mounted on a six-wheel, pneumatic tired truck equipped with 30″ feed and delivery conveyors. The primary unit which is used ahead of the secondary unit for gravel service normally consists of a 1036 jaw crusher with scalping screen mounted on a truck with a feed conveyor; for quarry service a large opening jaw crusher with apron type feeder is used. The moving weight of the secondary plant has been held at 39,000 pounds with an overall width of 8′ and overall height when operating at 13′. Height can be very readily reduced to 12′ to provide additional transporting clearance. Similarly, the weight of the primary unit for gravel service is but 23,000 pounds with an overall width of 8′ and height of 11′.

Moil point

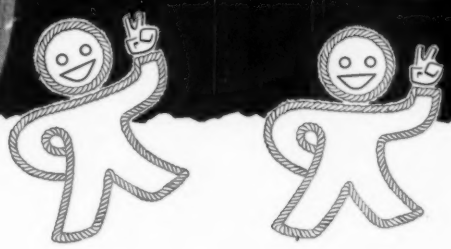
Manufacturer: The Iron City Spring Company, Pittsburgh, Pa.

Claims: Development of this double-angle moil point to be used with air hammers, for breaking concrete, brick work or other hole punching work, has exceptional cutting speed and resistance to wear. The shank is hexagon, the taper is square and the cutting point is round. The moil points are heat-treated by a process especially developed to bring out the fine qualities of the steel and to give the point long resistance to wear. The new double-angle moil point is furnished in lengths of 14″ to 30″, and with shanks 1⅛″ and 1¼″ x 6″.



2 KINDS OF WIRE

in Monarch PREformed



. . help conserve man hours . . save steel

Fewer shutdowns for rope replacement . . . lower actual rope costs . . . better all 'round service . . . Monarch Whyte Strand PREformed has always meant these.

But using PREformed today means much more. Because it lasts much longer than non-preformed, PREformed provides great savings in steel tonnage with the result that more men and more steel are available for vital defense needs. Help yourself to lower cost service; help defense, too, by buying PREformed. Make sure you get the CORRECT rope for your equipment: get Monarch Whyte Strand PREformed.

1 . . outer wires in each strand are Monarch PREformed's first line of defense. They have maximum tensile strength and great abrasive resistance.

2 . . inner wires in each strand are the reserve strength of the rope. They are specially drawn with maximum flexibility and toughness for inside service.

3 . . all wires in Monarch Whyte Strand PREformed are improved plow steel. Each wire is covered with heavy, tenacious, lasting protection: Macwhyte Internal Lubrication.

Please feel free to call on Macwhyte any time you would like us to check over your equipment. We'll do it without obligation and give you recommendations based on our experience on hundreds of cases similar to yours.

MACWHYTE COMPANY, *2903 Fourteenth Avenue, Kenosha, Wisconsin.* Manufacturers of wire rope to meet every need—Left & Right Lay Braided Slings—Stainless Steel Wire Rope—Aircraft Cable, Aircraft Tie Rods, and "Safe-Lock" Swaged Terminals.

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Wire Rope for MINING
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Field NOTES

1941 INDEXES AVAILABLE
Complimentary copies of Excavating Engineer's 1941 Index are available to all who request them. Address your request to Excavating Engineer, South Milwaukee, Wisconsin.

Thawing Frozen Ground

In connection with a construction job on the Northern Pump Company naval armament plant at Fridley, Minnesota, the George F. Cook Construction Company of Minneapolis developed a homemade ground thawing device which sharply cut time loss in a task where speed was very important.

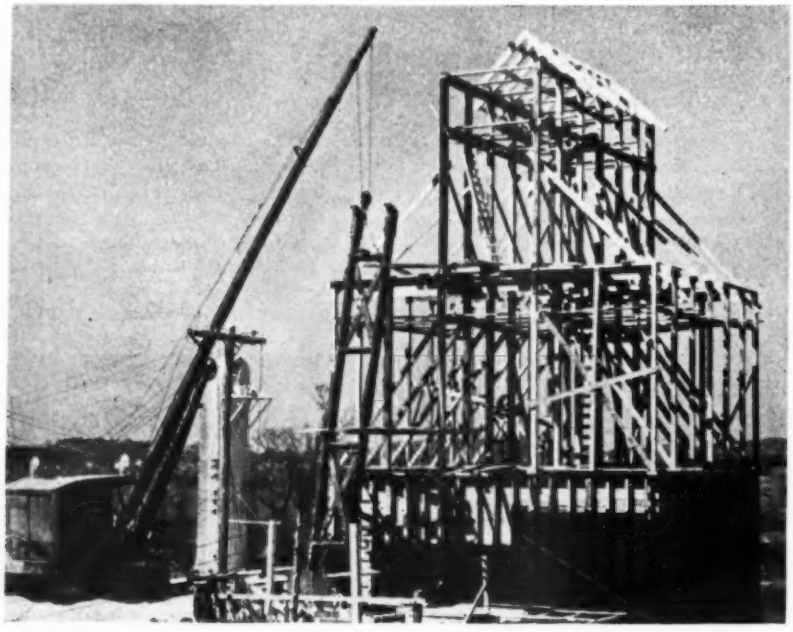
When the hard frozen ground was holding back trenching for laying of pipes, officials of the construction firm and engineers of the Northern Pump Company did some fast thinking. The result was a battery of halved sections of steel culvert plus a number of high pressure oil burners. Placed at one end of each of the covers, the burners created heat intense enough to thaw out two feet of ground frost in two hours. An additional advantage was that a great part of the moisture was evaporated during the thawing process, thus enabling trenchers to go to work immediately. It was pointed out, also, that dehydration was sufficient to allow laying of cement floors without further waiting.

At first the traditional method of using coke fires was tried, but because of the great need for speed and the disadvantage of the smoke and carbon monoxide this method was given up. The homemade defrosters were constructed at a cost of $146 each. The oil burners work under suction air pressure so that in case of a hose break the oil will not be sprayed all over. One hundred pounds of pressure was used. The first covers were made from four-foot culverts sliced and cut in eight foot lengths giving 32 square feet of ground surface covering. It was later found more suitable to use three-foot culverts sliced and cut in twelve foot lengths using the same capacity oil burners.

It is felt that this new rapid defrosting method will find a wide application where speed is essential in thawing limited areas of ground for building construction during the winter in northern climates.

The Northern Pump Company plant, where orders for $70,000,000 worth of naval armament are to be filled (production has already begun), is located on a 75-acre inclosure upon which nearly a mile of buildings are located. Construction is still in progress on additional buildings.

• Yes, it can be done! A Bucyrus-Erie 19-B shovel "subbed" as an emergency crane for the Kentucky Stone Company during the construction of their Mullins Station Quarry plant. A 60-foot timber was lashed to the boom with large U-bolts and trussed up with ⅜" wire rope. The temporary crane handled loads up to 6,500 pounds.



Avoiding Lime Burns

Skin burns from handling lime and Portland cement may develop into extremely serious skin conditions. In one case, a neglected skin irritation beginning at the edge of a wound, after some months of improper self medication, finally developed a degree of sensitivity so great that contact with wet concrete for one day resulted in swelling of the arm to more than twice normal size. Skin burns are caused by the caustic action from the hygroscopic properties of lime, caustic lime, and silicic acid. In addition a mechanical irritant action may also occur. It has been found, in some lime plants, that unscented talc powder dusted on the skin provides a cleaner form of protection than coating the skin with greases. When irritations do develop prompt and proper treatment with mild palliative lotions or ointments under the direction of a competent dermatologist and removal from exposure are indicated.—*National Safety Council*

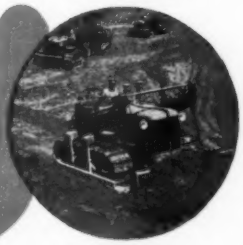
Installing Suction Pump Piping

The accompanying sketch shows an important detail that should be borne in mind when installing any kind of pump. Or, in the event that your pump is giving trouble, incorrect piping installation details such as shown here may be the reason why.

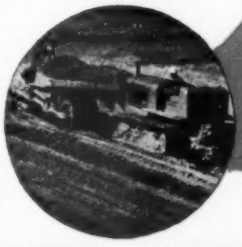
Usually a small amount of air is present in all water hence if any point in the suction piping (from well to pump) is higher than the level of the pump, the air will automatically separate from the water and will form a

PUSHING POWER *PLUS!*

Leveling rock or dirt . . . rooting out stumps or trees . . . tearing down banks or digging ditches —the 2-Cycle Diesel takes every job in stride. With a Baker 'dozer above . . . a Gar Wood at right!



Let 'em come! You can easily keep ahead of hauling equipment with a 2-Cycle Diesel doing the leveling. Shown here with a Buckeye 'dozer.



Smoothest pusher-tractor you've ever seen! You "gun" it and go, with 2-Cycle Diesel power! Operator simply feeds more fuel when going gets tough . . . rarely needs to shift gears. Keeps 'em moving!

Sock it to 'er! That's 2-Cycle Diesel Power you are "gunning" . . . PUSHING POWER *PLUS!* More power than was ever before packed into an engine of similar size . . . double the power strokes—hard-hitting power that gets more done! Smoother power that purrs quietly through toughest work . . . easier on your tractor and pocketbook. Time-saving power that maneuvers into position quicker . . . with throttle control, flashing pick-up and ability to turn on its tracks in high. Money-saving power that operates on ordinary Diesel fuels. Power that puts in extra time —starts instantly and goes to work sooner . . . no need to lose ½ hour periods greasing truck wheel assembly, either. One supply of lubricant lasts 200 hours in Positive-Seal truck wheels and idlers. EXTRA WORKING POWER . . . MORE ECONOMICAL POWER! That's MORE PROFITABLE POWER . . . the kind you want! Let your A-C dealer show you.

2-CYCLE DIESEL POWER

3 Sizes—HD-7, 60 h.p.; HD-10, 87 h.p.; HD-14, 132 h.p.

ALLIS-CHALMERS

TRACTOR DIVISION • MILWAUKEE • U. S. A.

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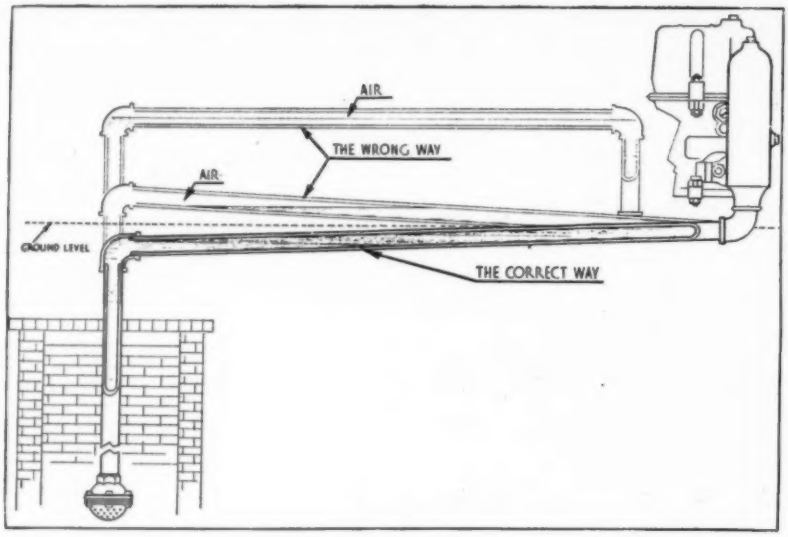


• Illustrated are the right and wrong ways to install suction pump piping. Read the accompanying article for some practical hints on pump pipe installation.

pocket in the high point of the line. The air will gradually collect there until it reaches such a volume that it merely compresses and expands with the piston strokes. There will then, of course, be no flow of water.

The sketch shows the proper method of piping. Note that the suction line should be laid with a gradual slope from the pump to the water supply. The slope of the pipe should be at least 1 inch to each 15 feet.

Just above the proper piping method the wrong way is indicated by means of lighter lines. If suction piping is installed in this manner the air will collect along the top of the horizontal pipe as shown. If, for any reason, you are forced to use such a method of piping be sure to use a tee and plug instead of the first elbow. You can then release the accumulated air when necessary. Also above the proper piping method another wrong method is shown. Notice that the elbow leading to well is slightly higher than the pump cylinder. Notice how the air collects at that high point.

Careful attention to this diagram while installing suction piping will save time and trouble. The suction line must be air-tight. Special care must be taken to lead or paint all joints to guard against leaks. If the suction line leaks, the pump will not work.

An "almost horizontal" suction line is practical up to 1,000 feet, but great care must be taken to gradually slope it from the strain on the suction valves in the pump. On suction lines over 100 feet in length it is essential to use an extra vacuum chamber to relieve the suction valves and also to guard against water hammer — *W. F. Schaphorst, M. E.*

Interpreting a Subcontract

It may be that if a certain subcontract for sewer excavation had been more carefully worded there would have been no lawsuit over it. But, be that as it may, the subcontractor's lawyers upheld his end of an argument that arose over the work that he was bound to perform, and over his right to cancel the contract.

Under the general contract, a city agreed to pay the general contractor $1.50 per yard for excavation, including cutting and replacing street pavement. The subcontract called for 75 cents per yard for work described as "excavation, backfilling, tamping pipe and fittings." The subcontract also specified that the "unit price for excavation includes backfilling and tamping." But the general contractor afterwards insisted that the subcontract so tied the general contract into its provisions as to obligate the subcontractor to replace pavement. Under that interpretation of the subcontract, the general contractor refused to complete certain progress payments due the subcontractor and the latter gave notice of his cancellation of the contract. In the sub's suit to recover the balance due him for work done, the general contractor counterclaimed damages, but the Pennsylvania Superior Court upheld a decision reached by the trial judge in favor of the subcontractor. Here is the substance of the decision:

It is clear that the actual cost of replacing paving would far exceed the cost of excavating, and $1.50 pay to the general contractor for each yard of excavation, including repaving, is out of line with only 75 cents pay to the subcontractor by the general contractor for doing the actual work. It is true that one cannot get out of a contract merely because he has made a bad bargain, but the courts will not read the contract as calling for a bad bargain if it is reasonably open to being read in a way that will make the agreement operate fairly. When the subcontract specified that excavation was to include such details as backfilling and tamping, it will not be assumed that the parties intended to include the much more burdensome work of repaving, when they could have easily specified that work, too, if they intended to include it.

The court then took up the question whether or not the subcontractor was justified in cancelling the contract and answered it yes. The court says that the general contractor took a firm stand, indicating that he would refuse to make any money settlement with the subcontractor which did not charge the latter with the cost of repaving the excavated area, and that because that stand was not justified the subcontractor was fully warranted in throwing up the job and suing for whatever balance was due him.

Those interested in making a close study of the complete text of the court's decision will find it in the opinion rendered by the Pennsylvania Superior Court, October 11, 1940, in the case of City of Farrell v. H. Platt Co. (15 Atl. 2d, 718.)—*Arthur L. H. Street, Attorney at Law.*

Measuring Those Bumps

Engineers of the U. S. Public Roads Administration have perfected a single-wheeled trailer outfit to measure the smoothness of roads. The machine calculates the up-and-down motion of the trailer wheel as it passes over irregularities and can be operated at speeds as high as 60 miles per hour.

"A guy can really move dirt with these Bakers," says Clyde Yeager, operator of a Model "M" A-C with Model 208 Bulldozer for T. M. White Co., Contractors, on widening of viaduct and approaches to U. S. 14 at Park Ridge, Ill. 5,000 yards was a push-over for this Baker!

Now more than ever you need BAKER *Hydraulic Bulldozers*

★ Greater Output — direct down pressure, easier control, greater moldboard area score bigger yardages every shift.

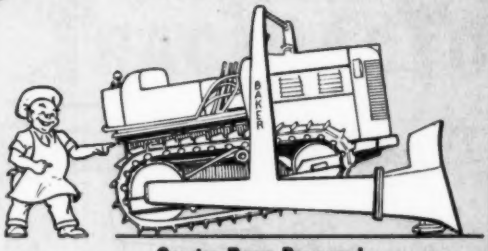
★ Less Maintenance—they'll do more with less wear and tear on the tractor, the hydraulic power unit and the bulldozer; conserving manpower and vital replacement parts, aiding greatly in defense.

★ More Flexible—three different moldboards fit one frame; can be changed in a few minutes —straight board for "cut and fill"; curved, boxed-end board for excavators; angle board (to left or right) for gradebuilding.

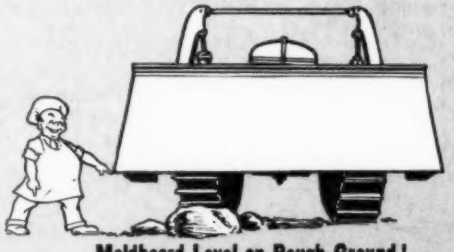
★ Complete Line — 7 bulldozer models with corresponding gradebuilder and excavator moldboards for gasoline and diesel tractors of any horsepower. See them at work on every type of construction project in Bulletin 834.

The Baker Mfg. Co.

504 Stanford Ave., Springfield, Illinois



Greater Down Pressure!
Full weight of tractor front end can be exerted on moldboard. No "linkage" losses —direct lift and down pressure.



Moldboard Level on Rough Ground!
Exclusive connected twin cylinders equalize pressure, keep moldboard level on rough ground — no by-passing material on one side of blade.

BAKER

The Modern Tractor Equipment Line for
EARTH MOVING
LEVELING AND GRADE BUILDING
SNOW REMOVAL
ROAD MAINTENANCE

For your convenience in writing to Baker Manufacturing Co., you will find a card bound in this issue.

NOT in the *Contract*

The click of knitting needles, the creak of the rocker and the ticking of grandfather's clock were all that disturbed the silence of the room. With childish curiosity little Ellen sat watching the purls and stitches.

"Why do you knit, Grandma?" she asked.

"Oh, just for the hell of it," the old lady replied.

Mrs. Brown: "Whenever I'm in the dumps, I get myself a new hat."

Mrs. Jones: "I was wondering where you got them."

Stout Woman—I want to return this washing machine.

Salesman—Why, what's wrong with it?

Stout Woman—Every time I get in the thing the paddles knock me off my feet!

A clothing merchant had been complaining of insomnia. "Even counting sheep is no good," he sighed. "I counted 10,000, sheared 'em, combed the wool, had it spun into cloth . . . made into suits . . . took 'em to Boston . . . and lost $21 on the deal! I didn't sleep a wink!"

Biography of a four-time widow: She first married a millionaire, then an actor, then a preacher, than an undertaker. One for the money, two for the show, three to make ready and four to go!

A Jew, a Scotchman, an Englishman and a Frenchman dined together. To everyone's astonishment, at the close of the meal the Scotchman spoke up, demanding the check. Headline in the newspaper next morning: "Jewish Ventriloquist Mysteriously Murdered."

"Wad'ya mean no swimming! We dug the ditch didn't we?"

Easy to Tell

A banker who lost an eye some years ago recently purchased an artificial one of which he was very proud. He showed it to a contractor who was in the bank one day and offered to place a bet that he could not tell it from his natural eye. The contractor promptly accepted and had no trouble in pointing out the artificial one. When asked how he did it, he replied, "Well, it doesn't have that cold-blooded, hard-hearted look that your natural eye has. It looks more human."

"My friends," said a preacher, "you will remember that I promised to speak to you tonight on 'The World's Greatest Liars,' and that I asked you to prepare your minds by reading the 17th chapter of St. Mark. Kindly raise your hands if you have done so." All hands went up.

"Thank you," continued the preacher. "As there are only sixteen chapters in St. Mark, my subject will not be entirely inappropriate."

Four marines were playing bridge in a hut on Wake Island. Suddenly another leatherneck burst into the room and shouted:

"The Japs are landing a force of about 200 men down on the beach!"

The four bridge-playing marines looked at one-another. Finally, one said, "I'll go, I'm dummy this hand."

The stork is one of the mystics,
And inhabits a number of districts.
It doesn't yield plumes
Or sing any tunes,
But helps out with Vital Statistics.

A pullman porter starting out on an all-night run had his trip cancelled. Returning home unexpectedly he took a look around the house, then got out his razor and began to strop it vigorously.

"What yo' going to do, Sam?" inquired his wife.

"If dem shoes sticking out from under the bed ain't got no feet in 'em, I'm going to shave," he replied nonchalantly.

INTERNATIONAL TRACTRACTORS

Are "All-Out-for-America"

AMERICA is engaged in a gigantic struggle for the very preservation of the nation. Industry and Agriculture look forward to a VICTORY in which all men and women will share—*and for which every man and woman must fight.*

Today we're only *starting* our great "all-out-for-America" production assignment. The job ahead calls for every ounce of energy at our command and for maximum production from machines and equipment.

International TracTracTors, *old and new,* are playing a vital role in this March to Victory. They are helping to build factories, roads, streets, airports. They're at work in mines and in quarries. You see them in forests and oil fields. All this varied activity is in addition to the vast army of TracTracTors in the service of the Armed Forces.

International TracTracTors are designed and built for the toughest going. But now, more than ever, even the best machines need servicing—the kind International Industrial Power dealers are equipped to give. Rely on their *trained personnel, modern equipment* and *complete stocks of Genuine IHC Parts.*

Let International Service keep your equipment in first-class working condition. Keep your TracTracTors working for a stronger America—and VICTORY!

INTERNATIONAL HARVESTER COMPANY

180 North Michigan Avenue Chicago, Illinois

INTERNATIONAL Industrial Power

Shots from the FIRING LINE

NSGA and NCSA Conventions

Informal and round-table discussions of the industry's part in the nation's war effort, operating problems, the labor situation in the industry throughout the United States, federal legislation dealing with price control, business conditions in 1941 and prospects in 1942 marked the 26th annual convention and exposition of the National Sand and Gravel Association. Paul P. Bird, association president, opened the three-day Cincinnati, Ohio, meeting on January 28.

Convening in joint-session with the 12th annual meeting of the National Ready Mixed Concrete Association, both associations enjoyed a large and interested attendance. Among the prominent speakers that headlined the National Sand & Gravel program were: Dr. Wilbur A. Nelson, administrator of mine priorities, OPM; H. S. Fairbanks, chief, Division of Research Planning and Information, Public Roads Administration; Thomas S. Holden, president, F. W. Dodge Corporation; G. B. Arthur, chief of the cement, lime and gypsum section, Division of Civilian Supply, OPM; James D. Marshall, assistant managing director, Associated General Contractors of America, Inc.; Bernard E. Gray, chief highway engineer, Asphalt Institute; and Walker D. Fuller, president, the Curtis Publishing Company, who gave the annual dinner address.

Closely following the sand and gravel convention, the National Crushed Stone Association also convened in Cincinnati on February 2, 3 and 4 for their silver anniversary convention. Called to order by President J. A. Rigg, the 25th annual meeting of the association presented a program of timely interest to all.

• Wm. Lather, Jr., Construction Company of Appleton, Wisconsin, uses an 8-yard FWD rear dump truck during fill placing operations for an overhead on Highway 41 north of Appleton.

Headline speakers discussed important phases of the war effort in relation to the crushed stone industry and to the nation's needs. Among the speakers and talks given were: Dr. Wilbur A. Nelson, OPM administrator of mine priorities, "Quarrying Priorities"; and Harry W. Flannery, CBS Berlin correspondent, "Berlin Report — Uncensored." Current problems of the crushed stone business served as the subject matter of speeches delivered by prominent members of the industry throughout the three-day session.

Separate sessions for operating men, salesmen, agricultural limestone producers and bituminous concrete producers gave full opportunity for informal and detailed discussions of practical topics of interest to each group. A highlight of the meeting was the silver anniversary banquet on February 3, when Toastmaster Otho M. Graves payed tribute to the men who contributed outstandingly to the growth and development of the National Crushed Stone Association during its 25 years of life.

Names of newly elected officials of the National Sand & Gravel and Nation Crushed Stone officials were not available at press time and will be published in the next issue.

AGC Convention at Indianapolis

The 23rd annual convention of The Associated General Contractors of America will be held at Indianapolis, Indiana, February 16, 17, and 18, 1942, instead of at Seattle, Washington, as originally scheduled, according to an announcement by Managing Director H. E. Foreman. Mr. Foreman states:

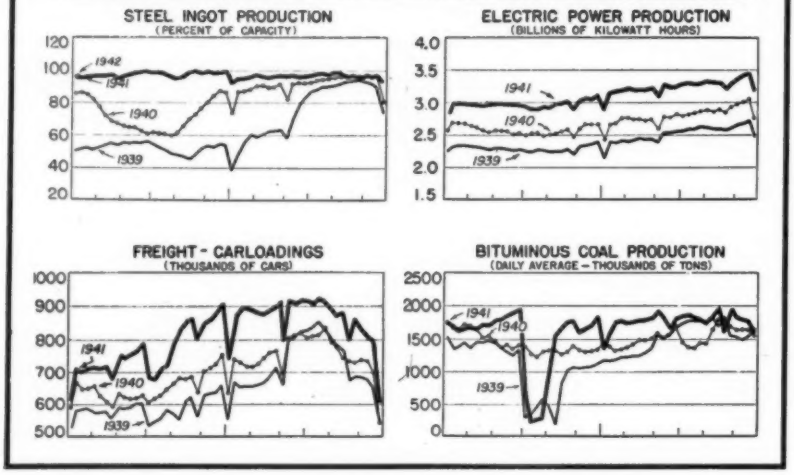
"This will be the first convention of the association during actual war times. It should be a historic meeting, for the A. G. C. was founded in 1919 as a result of a demonstrated need during World War I for such a national organization which could act as a liason between the government and the general contracting industry to expediate war construction. The principal business of the coming convention will be to:

"1. Develop a more complete program for meeting construction needs of the nation during the war period.

"2. Develop further means by which the general contracting industry, through the national association and the 90-odd chapters and branches, can cooperate with government agencies for war and essential civilian construction and civilian protection.

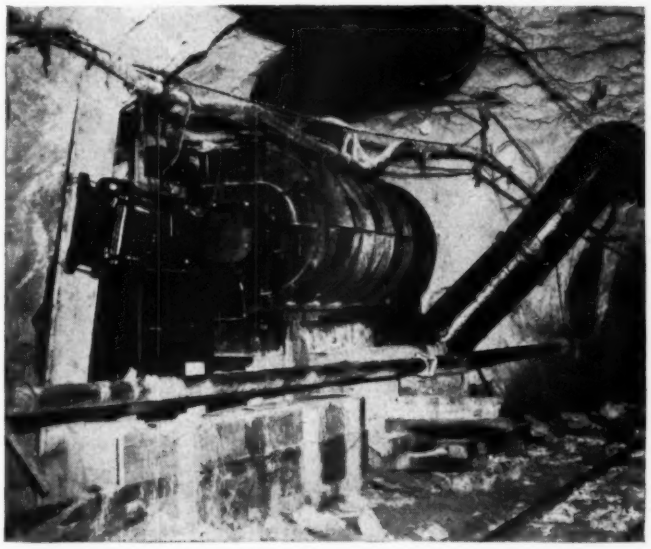
"3. Develop further a program for the imediate use of general contractors

BUSINESS INDICATORS



The Mountain that Breathes

for a Whole Construction Crew



The story of how one of the most successful tunnel-ventilation systems ever devised is helping to conquer the Continental Divide.

By H. R. WALLRATH
Industrial Department
General Electric Company

LIKE a giant respiratory system, deep in the breast of the Continental Divide an electrically powered tunnel-ventilation system is making engineering history. Installation of this system, which is one of the most efficient and effective ever devised, cut 20 minutes from each drilling cycle and added six feet to the daily push in the east portal of the fifty-million dollar tunnel.

When completed, this 13-mile tunnel will bring water from the western to the eastern side of the divide for irrigation of the fertile fields in northern Colorado, and for generation of power essential to war production in that territory.

Before this breathing method was devised, workmen had to wait after each blast for the smoke to clear. Now they return to their posts immediately after firing, without fear of silicosis and suffocation. Not only that, but the ventilator can be regulated to eliminate fog.

The ventilating system consists of heavy-duty reversible-type blowers powered by General Electric 2200-volt, 100-hp motors, connected to the blowers with V-belts. As the work progresses, these blowers are installed 9,000 feet apart along the tunnel. The third blower has just been put in.

The system operates with clockwork efficiency, day in and day out. After the holes have been drilled, the fans are shut off while the powder is being packed for blasting. Immediately after the charge is fired, the operator in the compressor house at the portal of the tunnel—from where the fans are controlled—is notified by telephone.

H. R. WALLRATH

Twenty seconds after the blower at the tunnel portal is started, the next blower starts, and so on down the line. This allows sufficient time for the air to reach each blower and thus prevents the creation of a vacuum, which might damage the duct or blower.

The fans exhaust for 20 minutes, sucking all the powder smoke from the heading. After a one-minute stop to prevent plugging, they are reversed to blow fresh air into the tunnel, and the blowers again start at 20-second intervals.

Fresh air is blown into the tunnel for about 30 minutes, and again the fans are reversed. Exhausting is continued until the heading crew is ready to shoot again. Then the fans are shut off and the whole procedure is repeated.

Blowing and exhausting are timed to conform with the outside temperatures to avoid fog collecting in the tunnel. Thus the heading and tunnel are always free from fog and smoke. This method is more economical than a double blower system—and it added six feet to the day's push.

This is another example of assistance rendered by General Electric engineers to promote electrical and mechanical progress in the construction industry. If you have a problem, their skill, plus G-E equipment, might well bring about the best solution. Just get in touch with our nearest office. We'll be glad to help you. General Electric, Schenectady, N. Y.

GENERAL ELECTRIC

For your convenience in writing to General Electric, you will find a card bound in this issue.

• Expanding cities mean more work for excavating equipment. Here the Bucyrus-Erie ½-yard dragshovel owned by the City of Riverside, California, excavates a sewer trench through the southwest part of the city.

throughout the country, large and small, in these construction programs.

"4. Bring to contractors latest and most complete information which can be given on all problems relating to their business.

"5. Explore problems relating to the future of the contract system of construction."

Because of the war, the convention will be cut from the usual four to three days. The general outline will be to hold the opening session Monday afternoon, February 16; meetings of the building, highway, and heavy construction and railroad contractors divisions on Tuesday; and general sessions all day Wednesday, concluding with the annual dinner that night.

Key Defense City Gets New Sewers

By Floyd Suter Bixby

Four miles east of Riverside, California, is March Field, the U. S. Army's west coast air training center. March Field's amazing growth during the past two years has reflected itself in an expanding construction program within Riverside. Building and street construction has been necessary to build housing additions for flying field personnel. The latest and most important project to be undertaken by this rapidly growing city is the construction of the $800,000 leg of the southwest outfall sewer.

Of several sections to be built throughout the city, the southwest leg is important in that it will serve the entire residential district in that part of Riverside. The southwest leg, 8 miles long, extends far down the left bank of the Santa Ana River.

Cutting a path for the new 24-inch vitrified clay sewer involved the excavation of approximately 150,000 cubic yards of sand, clay and gravel along the route. A trench excavating machine, to be effective, had to be able to dig a maximum depth of 29 feet. It was desirable to have a machine capable of performing other excavations on work contemplated later on; not necessarily allied with trench work. In addition, the machine had to be rugged enough to stand up under heavy digging without breaking down.

A Bucyrus-Erie 15-B machine was selected, and enough attachments were purchased to make it readily interchangeable for use either as a dragline, shovel or dragshovel. The dragshovel boom and bucket were installed for use on the new sewer and the machine went to work digging the trench for the 24-inch line.

At the time the job was visited, the 15-B machine was hard at work in the heaviest part of the digging. A primary cut had been made along the side of a hill above the river by a Cletrac-mounted Isaacson bullgrader, removing about three feet of material and leaving the area level. The 15-B machine was used to dig a secondary cut 14 feet deep and wide enough to accommodate the machine at the bottom of the cut. Only one of the cuts was so deep, so the dragshovel was used here rather than change the machine over to a dragline for only a few shifts. Even so, 640 cubic yards were dug and cast in 8 hours for the best digging of the job.

The final excavation to grade was also handled by the 15-B. Capable of digging from 14½ to 16 feet deep, the dipper reached the bottom of the trench without difficulty. Shoring was necessary on sandy parts of this third cut.

The top of the spoil pile was smoothed down by the Cletrac, and enough material was retained on the berm to permit backfilling over the finished sewer. Both machines, working in this manner, accounted for a job record of 2,800 cubic yards of earth in two shifts.

The single weight pipe sections, weighing 472 pounds each, were cradled and placed by WPA labor. Each joint received a jute packing on the back side with Tegul-Amco silicon sulphate on the outside. Backfill was placed under the pipe by hand tampers until the pipe was covered about 18 inches. The remainder of the fill was then pushed in by the Cletrac mounted Trac-Dozer. The entire job, with the help of both new machines, is moving nicely ahead on schedule.

Wisconsin Highway Contractors Collect Scrap

Taking the lead in the nation, Wisconsin Highway Contractors are conducting a scrap steel collection campaign as one phase of their effort to cooperate to the fullest possible extent with the war effort. E. E. Hoebel, executive secretary, Wisconsin Road Builders Association, said in a telegram to the OPM, "After a careful survey of the highway industry in Wisconsin, the Wisconsin Road Builders Association is positive that a great many carloads of steel scrap can be assembled by us for shipment to mills. Our fullest cooperation in the war effort is offered. All collecting will be done gratis by Wisconsin highway contractors."

Stating that "This offer of cooperation and tender of service is the first offer of this kind that this office has received," Mr. Borinstein, consultant, iron and steel branch, OPM, in answer to the telegram requested to be kept fully informed as to just what is accomplished as he "shall take steps to obtain similar cooperation in other states."

Citing the acute shortage of scrap Mr. Borinstein's letter continues, "In an effort to stimulate the flow of scrap, this office has made an appeal to states, counties, and cities to dismantle abandoned bridges, viaducts, water towers, and abandoned structures from which scrap steel would be available, and to have collected all scrap in all of their institutions and departments.

"There are many abandoned boilers and tanks, and dormant scrap in numerous types of construction and equipment in many out-of-the-way places.

"It is my opinion that your association can be helpful in getting a considerable tonnage of dormant scrap so that this scrap may be properly pressed and speeded to the mills and foundries which need it so badly."

$137,500,000 for Defense Roads

Federal approval of highway projects will be restricted to "those essential to national defense as certified by appropriate federal defense agencies," according to the Federal Works Administration announcement that accompanied the apportionment among the states of $137,500,000 of federal aid highway funds for the fiscal year beginning July 1, 1942.

Funds authorized by the Federal Highway Act of 1940 provide $100,000,000 for improvement of the Federal aid highway system, $17,500,000 for sec-

Leonard and Slate, contractors on an emergency air base near The Dalles, Oregon, are handling long-haul earthmoving with four Tournapulls; one Standard C (shown) with 11-yard Carryall and three Super C's with 15-yard Carryalls. After spreading a smooth sand base over natural lava rock bed, the Tournapulls hauled in gravel from special borrow pit 2.9 miles from runways, where they covered the sand base with a layer of gravel to stabilize the fill. The Tournapulls averaged 5.8 mile round trips every 30 minutes. Writes S. C. Guess, Assistant Resident Engineer, "I have watched these Tournapulls in action under the most adverse conditions of wind and sand for the past 5½ months and in my opinion they're tops in earth-moving equipment."

NOW

MORE THAN EVER

FOR MORE YARDAGE AND LOWER COSTS

ON LONG HAULS YOU NEED TOURNAPULLS

Tournapulls extend tractor - scraper economies to your longer hauls. Like big-capacity LeTourneau Carryalls, they are quickly pusher loaded. They haul at fast construction speeds (up to 14.3 m.p.h.) and spread their own loads, thus eliminate shovels and elevating graders for loading and 'dozers for spreading out the fill.

More Traction — High Average Speeds

Tournapull weight (plus 40% of the Carryall *and its load*) is centered on the drive wheels to give you the greatest possible tractive power. That means plenty of surplus rimpull for quick acceleration to top speed or for pulling through tough spots. Result—*high average speeds* and more *big* loads hourly.

Easy, Simple Operation

Just as tiller wheels have been discarded on track-type tractors, so LeTourneau has eliminated front steering wheels on Tournapulls. You pull and steer with the same wheels, just as you do with tracks on a track-type tractor. There are no front wheels to bog down when traveling or turning in mud or sand. Two-wheel design enables you to turn faster and sharper. Big brakes on both Tournapull and Carryall assure quick stopping and complete control on grades. Same fast, sure-acting LeTourneau cable control that has proved so popular on tractors, makes Tournapull-Carryall operation easy, too.

500 Model C's in Use

Today more than 500 Model C and Super C Tournapulls are in use, cutting costs on long hauls for hard headed, profit-minded earthmovers in 37 states and several foreign countries. Tournapulls can do the same for you — see your LeTourneau-"Caterpillar" distributor for complete details NOW

Loading common earth on the level with a "Caterpillar" D8 pusher and hauling over good roadways, you can expect the following yardages in a 60-minute hour from Tournapulls:

THESE PROFIT-MAKING YARDAGES CAN BE YOURS WITH TOURNAPULLS

Haul-One Way	98 H.P Model C (11 yards heaped)		150 H.P. Super C (15 yards heaped)	
	Trips	Pay Yards	Trips	Pay Yards
600	17.1	150	15.0	180
1200	14.0	119	12.0	144
1600	12.3	104	10.7	129
2000	10.9	93	9.7	116
3000	8.4	71	7.6	91
5000	5.8	50	5.4	65

LETOURNEAU

PEORIA, ILLINOIS • STOCKTON, CALIFORNIA

***For Lowest Net Cost per Yard*-CARRYALL* SCRAPERS, ANGLEDOZERS*, POWER CONTROL UNITS, BULLDOZERS, ROOTERS*, TRACTOR CRANES, PUSHDOZERS, TOURNAPULLS*, SHEEP'S FOOT ROLLERS, TOURNATRAILERS*, TOURNACRANE.** *Name Reg. U. S. Pat. Off.

Federal Highway Allotments for 1942

State	Regular Federal Aid	Secondary or Feeder Roads	Elimination of Hazards at Railroad Grade Crossing
Alabama	$ 2,083,755	$ 364,657	$ 405,128
Arizona	1,435,456	251,205	129,583
Arkansas	1,709,471	299,157	336,460
California	3,989,896	698,232	798,434
Colorado	1,793,222	313,814	255,449
Connecticut	620,283	108,549	164,002
Delaware	487,500	85,313	97,500
Florida	1,431,426	250,499	299,694
Georgia	2,517,196	440,509	495,487
Idaho	1,238,004	216,651	165,774
Illinois	3,947,786	690,863	1,012,936
Indiana	2,409,852	421,724	503,499
Iowa	2,494,254	436,494	538,416
Kansas	2,524,344	441,760	485,674
Kentucky	1,853,318	324,331	358,327
Louisiana	1,479,614	258,932	317,974
Maine	866,360	151,613	133,885
Maryland	832,207	145,636	197,436
Massachusetts	1,310,162	229,278	388,101
Michigan	3,028,945	530,065	651,739
Minnesota	2,702,831	472,995	526,346
Mississippi	1,780,492	311,586	314,073
Missouri	2,963,919	518,686	578,946
Montana	2,020,796	353,639	262,388
Nebraska	1,991,271	348,472	333,931
Nevada	1,275,386	223,193	97,500
New Hampshire	487,500	85,313	97,500
New Jersey	1,273,680	222,894	376,647
New Mexico	1,622,549	283,946	177,246
New York	4,821,071	843,688	1,330,156
North Carolina	2,387,356	417,787	514,993
North Dakota	1,499,001	262,325	299,447
Ohio	3,520,305	616,053	818,984
Oklahoma	2,272,612	397,707	442,035
Oregon	1,649,132	288,598	228,533
Pennsylvania	4,087,815	715,368	1,089,534
Rhode Island	487,500	85,313	97,500
South Carolina	1,346,362	235,613	298,209
South Dakota	1,577,778	276,111	253,551
Tennessee	2,112,542	369,695	382,507
Texas	6,313,862	1,104,926	1,098,295
Utah	1,123,730	196,653	129,761
Vermont	487,500	85,313	97,500
Virginia	1,844,177	322,731	374,250
Washington	1,585,782	277,512	303,889
West Virginia	1,096,603	191,905	264,466
Wisconsin	2,400,972	420,170	483,930
Wyoming	1,245,987	218,048	131,879
District of Columbia	487,500	85,313	97,500
Hawaii	487,500	85,313	97,500
Puerto Rico	493,438	86,352	165,506
TOTAL	$97,500,000	$17,062,500	$19,500,000

ondary roads, and $20,000,000 for elimination of grade crossing hazards.

Under the Defense Highway Act of 1941, the federal government's share of the cost of improvements on the strategic network of military highways is increased from 50% to 75% and the state's share reduced to 25%.

All work will be done in cooperation with the state highway departments according to federal aid procedure, the administrator explained, "except that projects will be limited to those having definite defense significance." He added:

"Improvement of sections of highway that have been found to be inadequate for the greatly increased volume of defense traffic, strengthening or replacement of weak bridges on main highways, and improvements desired by defense officials in connection with planned operations will make up the program."

Administrative expenses have been deducted from the figures in the table above.

Dolomite Grows in Importance

Increased importance of dolomite in the national war effort as a source of magnesium metal for the aircraft industry and of furnace linings in great demand by the steel industry, has resulted in publication of a pamphlet and map by the U. S. Bureau of Mines on sources and uses of dolomite, according to Dr. R. R. Sayers, director of the bureau.

Dolomite, a magnesium bearing limestone, is found in many parts of the nation, particularly the eastern half. Three-fourths of the dolomite output is used as crushed stone for concrete aggregate, in highway construction, as riprap and railroad ballast, and as a fertilizer and soil conditioner. It also is used in the manufacture of pipe and boiler covering, paper, paints, calcimine, whitewash, varnish, flooring and many other products.

Construction of plants to utilize ground dolomite in combination with other ores and chemicals in the manufacture of magnesium metal has been authorized by the Defense Plant Corporation, according to the bureau report.

A copy of the pamphlet and map may be obtained by writing to the Bureau of Mines, Department of the Interior, Washington, D. C., for Information Circular 7192. "Occurrences and Uses of Dolomite in the United States" by Shirly F. Colby.

Southeastern Road Officials Convene

The Southeastern State Highway Officials will hold their winter meeting at the Grove Park Inn, Asheville, North Carolina, on Thursday and Friday, February 12 and 13, 1942.

Member states of the organization are: Alabama, Florida, Georgia, Kentucky, Mississippi, North Carolina, South Carolina, Tennessee, Virginia, and West Virginia.

Share Your Books With the Boys in Khaki

Books by the million changed hands in the National Defense Book Campaign starting Monday, January 12, 1942, when readers in homes throughout the land shared their books with our soldiers, sailors, and marines.

The campaign, sponsored by the American Library Association, American Red Cross, and United Service Organizations, seeks ten million books for U.S.O. houses, army "dayrooms," ships, naval bases, etc. Books should be taken to libraries, where they will be sorted, repaired if necessary, and sent on as quickly as possible to the spots where men in the service want books. In many communities, schools and other conveniently located places will be designated as collection centers. Unbound magazines and newspapers will not be handled.

Although the government provides libraries in the larger camps, the smaller units have no library at all, and even in most camps where libraries do exist, the demand for recreational reading is usually far greater than the supply. Books provided through the book campaign will thus supplement the government's existing library facilities. Men on leave—and in "off hours"—depend on the dayroom of their company and their U.S.O. house for their leisure-time reading.

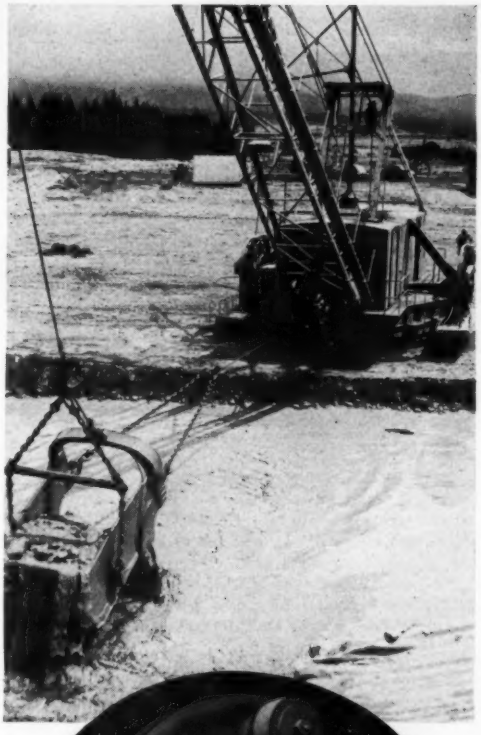
About the kinds of books to be collected—well, what kinds of books do you like? Our soldiers and sailors have a wide range of reading interest and

SAVE TIME

with

A WALKING ACTION

that lasts



The exclusive Bucyrus-Monighan Rolling Cam gives you a walking action that "cushions down" the machine at the end of each step with an ease that means long life. And the Rolling Cam is so built that Bucyrus-Monighan walking maintains its smoothness and efficiency even after years of hard service, without need for constant adjustments. The "cushioned" walking saves maintenance and repairs to the walking mechanism and to the entire machine. Lasting walking effectiveness has repeatedly been proved in the field by Bucyrus-Monighans which step out as positively, as surely and as gently after moving 15 or 20 million cubic yards as they did when they were new. If you have vital war digging to do, Bucyrus-Monighan efficiency will help you do it quickly and well.

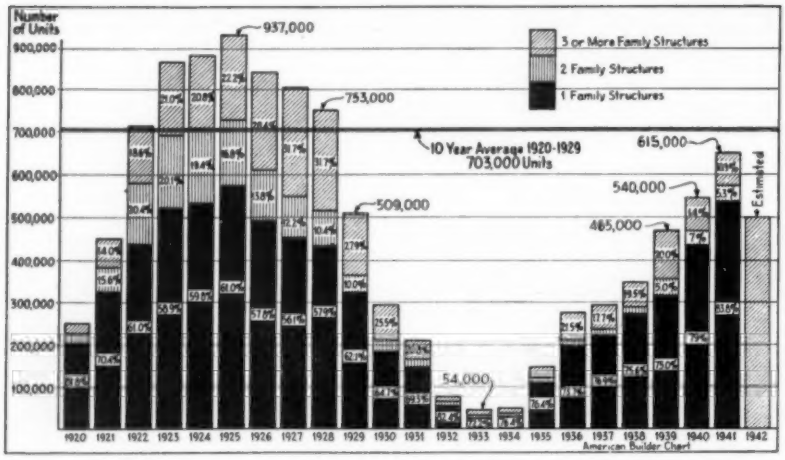
The 3-W usually uses 80 ft. to 90 ft. booms, 3 to 3½ yard buckets. Other models carry booms to 250 ft. buckets to 20 yards.

BUCYRUS MONIGHAN

Sold by BUCYRUS • ERIE

SOUTH MILWAUKEE, WISCONSIN

For your convenience in writing to Bucyrus-Erie Co., you will find a card bound in this issue.



like those very titles, too! They are particularly eager for up-to-date technical material to help with their problems, as well as books on current affairs and plenty of good fiction.

Put your name and address in the books you give — the boys will be so interested to know "who gave what"!

• Twenty years of the nation's dwelling unit construction activity (except farms) are presented in this "American Builder" chart which indicates the trend in home construction.

New Jersey Plans to Divert Priority Restricted Funds

By Bethune Jones

That federal priority restrictions on highway construction may tend to incite wholesale diversions of state highway funds to other uses is indicated in New Jersey, where proposals are being advanced for non-construction disposal of a huge accumulation of highway revenue.

With New Jersey motor vehicle tax revenues expected to soar to a new peak of $55,000,000 next year, it has been indicated that about $21,000,000 of new construction revenue will be available. Added to amounts previously appropriated but still unspent, this will reportedly bring to nearly $50,000,000 the total that could be spent next year by the state highway department on direct road construction.

On the basis that defense priority rulings will prevent the use of any substantial portion of such a sum for highway construction, proposals for its diversion to other purposes are gaining momentum. The eagerness with which the diversion possibilities are being seized upon by legislators and political forces makes it appear extremely unlikely that the bulk of the road fund accumulation will be left intact for construction use after the lifting of priorities.

Possibility of using accumulated highway funds for tax relief will be thoroughly studied by the New Jersey State Legislature, it was declared October 17 by Senator Robert C. Hendrickson of Gloucester County in a statement following other similar proposals.

One of the most influential members of the Republican legislative majority, Hendrickson said that consideration will be given to proposed reduction of realty and gasoline taxes and motor vehicle license fees and establishment of a "rainy day fund" to finance relief in the post-defense period.

"It is certainly not sound public policy," Senator Hendrickson asserted, "to accumulate large static sums of tax moneys in the state treasury at a time when New Jersey citizens face a drastically increased burden of federal taxation and are clearly entitled to all possible relief on non-defense taxation.

"If it is going to be impossible because of federal defense priorities to do any substantial amount of new road construction in this state in the next few years, it would seem to be economically unsound to continue to permit these funds to pile up and lay idle and to deny our citizens much needed tax relief during this crisis. * * *

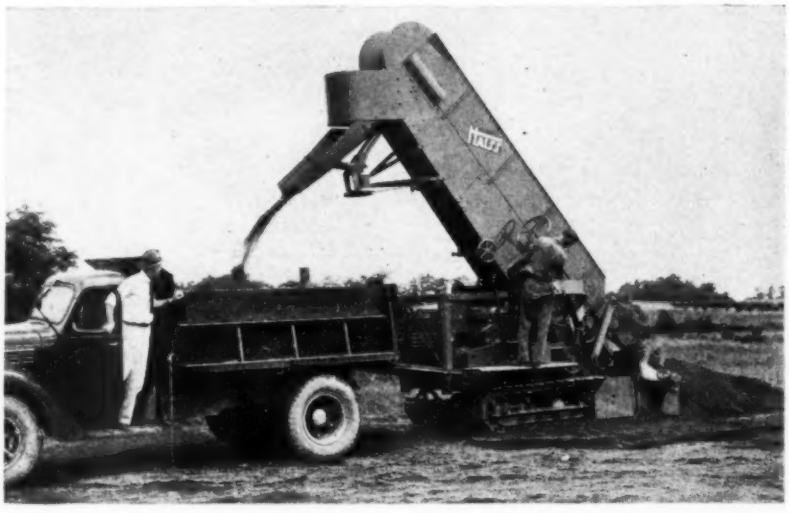
"I wish to make it perfectly clear, however, that I regard it as essential that sufficient moneys remain in the highway fund to take care of all constructions which may be authorized from time to time by the federal priority authorities."

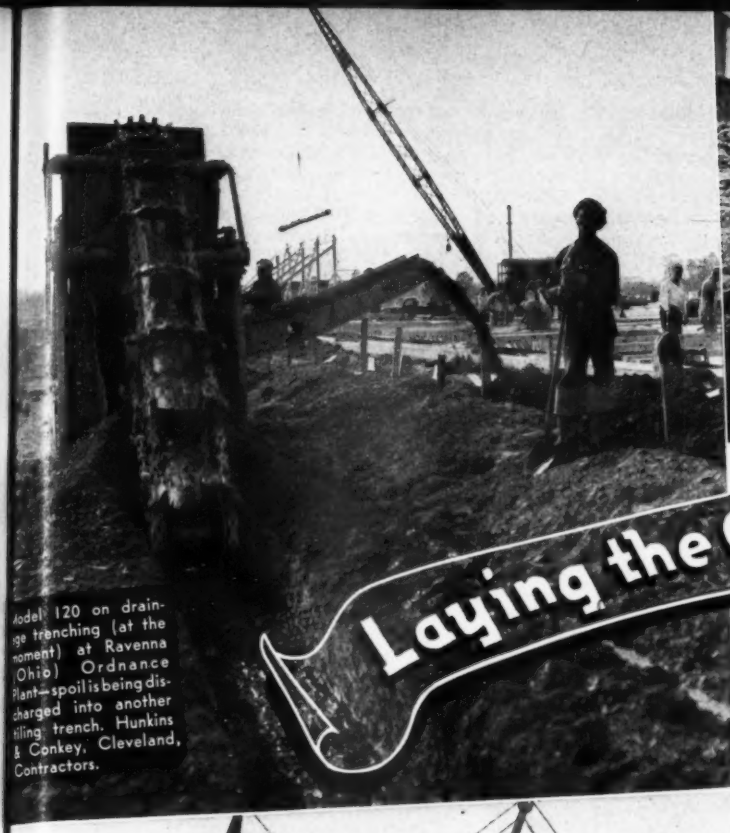
The proposal to divert highway funds into a special emergency relief fund for the post-defense period is already before the state legislature in the form of legislation introduced last June by Assemblyman Wesley L. Lance, Hunterdon County Republican. It already has passed the house and was ready for senate consideration, when the legislature reconvened in November after a recess. Enactment of the legislation would mean that highway funds, which were diverted in the sum of approximately $100,000,000 to finance the bulk of New Jersey relief costs during the past depression and which still continue to finance what currently remains of the relief problem, would be set aside in advance in anticipation of another depression.

The Lance bill, as introduced, would commit to the proposed "rainy day fund" all highway revenues not appropriated, all lapsed balances of the highway fund appropriated but not spent at the end of each calendar year and "such other sums as shall be transferred." Through a companion bill limiting highway construction to $10,000,000 in any one year, he would make available for diversion to future unemployment relief additional funds resulting from decreasing debt service requirements.

The proposals for tax relief through highway fund diversion had not taken actual legislative shape at this writing. One suggestion, however, was that highway funds be substituted for the state school tax to effect a saving of some $17,000,000 a year for local real estate taxpayers. Another proposal was that a substantial percentage of the high-

• Chips for a seal-coat on some Maryland secondary road are loaded to a truck by the highway department's Haiss track mounted loader.





Model 120 on drainage trenching (at the moment) at Ravenna (Ohio) Ordnance Plant—spoil is being discharged into another filling trench. Hunkins & Conkey, Cleveland, Contractors.

Its simplified control and ease of operation is the envy of the "tank corps"—Model 410 makes sewer trench at fast expanding Fort Knox, Ky. Digs forward or backward for undercutting drives, etc. Works in any weather or temperature that the operator can take.

Laying the Groundwork for Defense

Flame hardened gears, manganese steel bucket chain links and pins, chrome-nickel steel dual-driven excavator drive shaft are typical of the construction features that will see this "260" through the next couple of World Wars. It's making trench 5' wide by 15' deep on California defense housing sewer main extension.

Ahead of the regiments, the airports, the naval bases, the ordnance plants, had to come—and still have to come—trench for foundation footings, drainage, sewage, water and in some cases gas and electricity. Trench dug so that those championing democracy's cause can train and work under democracy's high standards.

Buckeye Trenchers have shouldered the burden of laying this groundwork for defense and the big, modern Buckeye plant is working at top speed turning out new, fast trenchers so contractors can meet the "deadlines" set by Uncle Sam.

BUCKEYE TRACTION DITCHER CO.

FINDLAY, OHIO

Built by Buckeye

Convertible Shovels

Trenchers

Tractor Equipment

R-B Finegraders

Road Wideners

Spreaders

way revenue be returned to county governments in proportion to the automotive taxes paid by residents of each county.

The new wave of diversion fever began sweeping over New Jersey after State Highway Commissioner E. Donald Sterner submitted his annual report to Governor Charles Edison on October 15. On the basis of this report, which estimated next year's highway fund revenue at $55,000,000, observers expressed belief that, after allowing for the diversion of $4,000,000 for 1942 unemployment relief and various other deductions regularly taken from the highway fund, approximately $21,000,000 new revenue would be available for road construction or such other purpose as the state legislature may determine. Together with many millions more appropriated for construction in 1941 and prior years but not yet expended, it was indicated a total of nearly $50,000,000 would be available for direct construction or other uses.

Reason for the huge backlog of unspent millions is that New Jersey highway construction has been virtually at a standstill because of Governor Edison's investigation of the highway department. The governor froze all highway funds by executive order earlier this year, permitting only such expenditures as were authorized by the state finance commissioner. In addition, the investigation has tied up right-of-way experts and key men of the department so that few road contracts have been let this year.

At this writing no major contracts had been let since spring, although the weather has been unusually conducive to construction. The state's entire current-year $3,500,000 federal-state matched road program was intact, no contracts having been let against it. Nearly $7,000,000 of the $7,079,828 direct state construction program for this year was not under contract.

Meanwhile, decreasing debt service charges, increasing highway revenues and declining unemployment relief costs have combined to make the highway fund's financial position the strongest in years. Revenues for this year will be $3,000,000 beyond estimates. Gasoline tax revenues alone will be $1,700,000 above the $24,700,000 estimate, reaching a new high of $26,400,000.

The gasoline shortage scare has not yet curbed the increasing gasoline tax yield. Recognizing, however, that there may be a decline next year due to increased costs or inadequate supplies, the 1942 gasoline tax estimate is $24,600,000. Highway officials believe this is too conservative but are required by law to accept the estimates of the motor fuel division of the state tax department.

Increased 1941 revenues are expected to start the highway fund off with a $2,900,000 unappropriated balance January 1. Even with the conservative gasoline tax estimate, the 1942 revenues are expected to reach $55,000,000. Highway officials believe they may reach $57,000,000.

Thus, New Jersey appears to be in the paradoxical position of rolling in road construction fund wealth but with little chance that any great portion of it will be used for construction purposes.

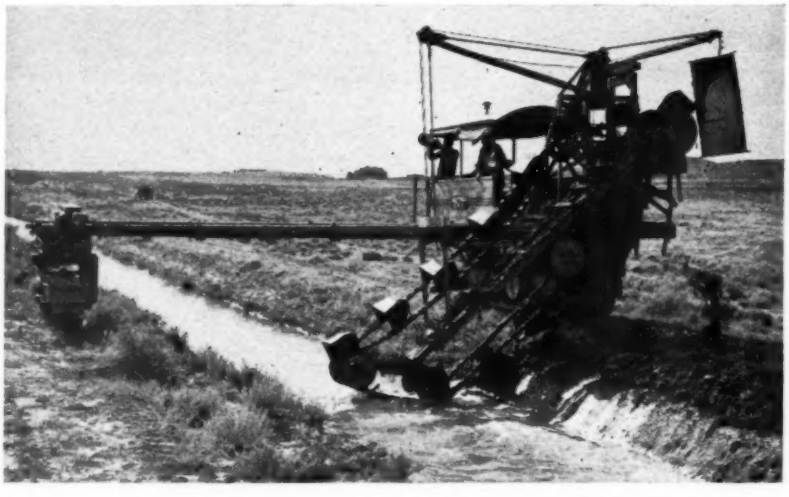
Riverton Project Uses Ditch Excavator

The Riverton Project of the U. S. Bureau of Reclamation, located in the central part of Wyoming has been making successful use of a mechanical ditch excavator since 1939. At the present time it comprises about 35,000 acres of irrigated land and another 7,500 acres of irrigable land that has not yet been brought under cultivation. The project is 32 miles in length and water is supplied to the land through some 240 miles of canals and laterals.

Prior to the fall of 1939 ditch cleaning work was accomplished with team and scraper. Farmers from the project were employed, using their own equipment. This method was not too satisfactory in that it was slow and left the ditch banks in a rather rough condition and if the ditches were wet it was hard to remove the mud.

A Bucyrus-Ruth excavator was purchased and placed in operation on the project in October, 1939 for cleaning laterals. During the fall of 1939 and from March through November, 1940 approximately 100 miles of ditch were cleaned with the machine. In all, a total length of 1,019,500 lineal feet or 193 miles of single bank was cleaned. The larger laterals require the passing of the machine on both banks while the smaller laterals are cleaned at one operation. The machine was operated 2,065 hours on actual digging, 275 hours on moving and 60 hours were lost in making repairs. Rate of travel of the machine while in operation averages 500 feet per hour.

Officials of the district found that the excavator cleaned the ditches faster and at less cost than former methods. The length of the cleaning system was practically doubled since time is now limited only by the freezing of the ground. Cleaning operations are fully as satisfactory with water in the ditch as without. No inconvenience is caused farmers supplied by the ditch by having to turn the water out if it is necessary to clean the ditch during the irrigation season. Banks are also left in a uniform shape and the hydraulic properties are improved.



• A lateral ditch in the Riverton Project of the U. S. Bureau of Reclamation receives the attentions of a Bucyrus-Ruth excavator.

Recover Oklahoma Zinc Tailings

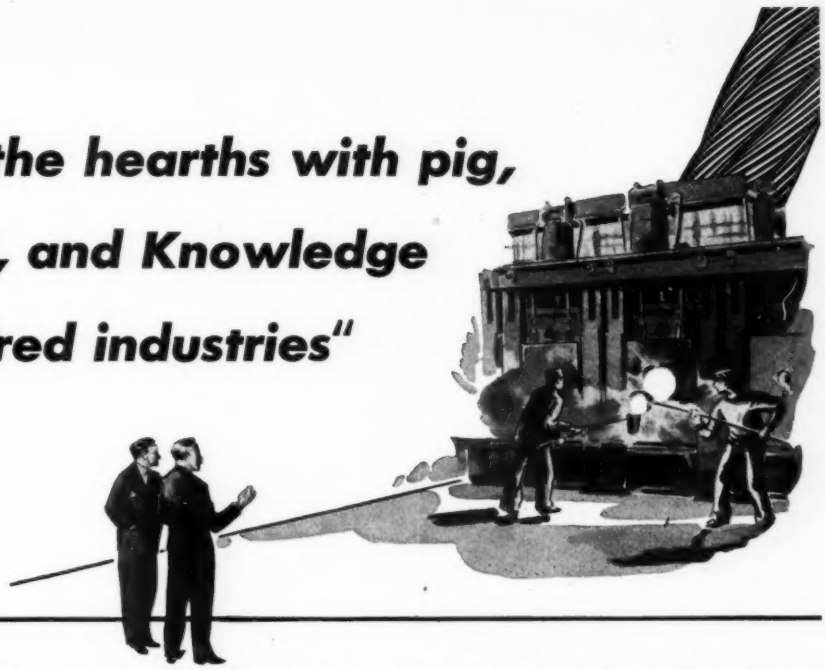
By Gene Zenier

At the Western Mining & Milling Company, Picher, Oklahoma, both men and machines are working endlessly, by day and by night, rain or shine, twenty-four hours per day, seven days per week. Uncle Sam asked for zinc as fast as he could get it and that demand has set the pace for everyone in the company's organization, and every other mining organization in the Tri-State District.

In order to explain the present operations it is necessary to turn back the pages of history twenty years, at which time this company, or these operations, were known as the "Anna Beaver Mining Company." In those old days, mining companies did not use the modern flotation system, and thus left much zinc in the waste material. Millions of tons of tailings have been left here from the old "Anna Beaver Mine," in huge waste piles. The old miners from the "Anna Beaver" probably thought that stuff was nothing but pure waste. But today, they are re-treating the millions of tons of tailings which have been laying here for over twenty years.

The contract of hauling the tailings to the receiving hoppers is held by Huron Horine, a loading and hauling

"You charge the hearths with pig, and scrap, and Knowledge of a hundred industries"



For this is Roebling "Blue Center" Steel

"It's fired for many hours before it's ready to pour, and during the better part of two shifts you put into it many things. Some are ingredients that anyone can use in open hearth steel. And some are not . . .

As the empty hearth begins to glow, you lay your silica bottom. You're making "Blue Center" steel, and it calls for purer raw materials. Good pig, selected scrap and plate.

Long daytime hours and nighttime hours of firing, and at their end, the one right moment when the steel is ready to pour. When is that moment? Shake hands with Andrew Fors, one of those whose eyes since 1906 have been an ingredient of Roebling ingots. Now he's passing his melter's skill on to his son at Roebling. Yes, skilled eyes and eyes alone can tell when the melt is ready. There is no other way . . .

There goes another strange ingredient in. That melter's taken out a sample, to put back something bigger...Knowledge, from the Roebling laboratory and field. Knowledge of a hundred industries, and steel that will exactly meet the needs of each. Every melt's a special melt — right for aircraft control cord, or elevator cable, or factory cranes . . . right for tugboat hawsers, or mine hoists, or oil well drilling lines.

That's the only way you can make the steel we use in "Blue Center" Wire Rope. You start right with the way the ingot's made . . . to meet its job right from the first. We call it "tailored steel", and it's worthy of the Roebling Trade Mark, from the time it leaves the open hearths . . ."

JAR ROEBLING

Knowledge of men in the Roebling mills, of Roebling men in the field . . . Roebling process control and engineering and research . . . there's many a hidden ingredient in "Blue Center" Wire Rope. Reasons why it lives so long, and never fails to deliver its full measure of service.

JOHN A. ROEBLING'S SONS COMPANY
TRENTON, NEW JERSEY
Branches in Principal Cities

THAT'S THE ONLY WAY TO MAKE

ROEBLING
"Blue Center"
STEEL WIRE ROPE
PREFORMED OR NON-PREFORMED

For your convenience in writing to John A. Roebling's Sons Co., you will find a card bound in this issue.

• Top: Modern flotation technique is making it possible for the Western Mining & Milling Company to reclaim zinc left in old spoil piles near Picher, Oklahoma. Here a Bucyrus-Erie 15-B loads tailings to a Landis bottom dump trailer. Bottom: General view showing company mill, storage hopper and waste pile. About 5,000 tons of tailings are run through this mill every 24 hours.

contractor from Picher, Oklahoma. Since the mill runs through 5,000 tons of tailings every 24 hours, or about 35,000 tons per week, Contractor Horine has a large task on his hands. His loading equipment consists of two Bucyrus-Erie shovels, a 15-B and a 29-B. Both shovels operate 24 hours per day, 7 days per week, the 15-B averaging about 50 tons per hour and the 29-B over 150 tons per hour. For his hauling equipment, Mr. Horine is using three trucks, two Internationals, a KR-7 and a KR-10, and a 1½ ton G.M.C. The two smaller trucks are equipped with 10 ton capacity semi-trailers and the KR-10 is equipped with a 20 ton semi-trailer. These trailers are manufactured by the Landis Steel Construction Company, of Picher, Oklahoma. They are equipped with an air controlled bottom dump which is used to release their load into the hoppers. The trailers attach to the truck by a ball and socket connection. The average run, one way, to the hoppers is about half a mile. Production operations are under the supervision of H. H. Hartzell, superintendent, and B. H. Lanham, foreman.

From the receiving hopper the tailing rock is carried to a storage hopper by means of a belt conveyor. From the storage hopper it goes to the concentrating plant where it is screened at 9/16 on a 6′ screen. The over-size rock comes down on a set of 42″ rolls and is reground in a closed circuit. Rocks or chats smaller than 9/16″ passes over a battery of 12 rougher jigs. The jigs recover the chats as gravity makes it settle on the bottom of a sieve. From here the waste goes out on the spoil pile. About 8,000 gallons of water per minute are used in this operation. From 9/16″ the chat is reground to 3/16″, following the same operation. From here, the 3/16″ smittem goes over a sloughing jig, then passing through the ball mill, a huge steel compartment with seven tons of steel balls that finally pulverize the 3/16″ smittem.

The pulverized material then passes through a modern flotation system. Western Mining & Milling Company is using Denver "Sub A" flotation machines, consisting of seventeen cells. By use of copper sulphate, sodium aerofloat, and cresylic acid, the flotation machines remove the precious zinc from the material. It's a long process but the zinc keeps pouring out, day and night to do its share in filling Uncle Sam's mineral needs.

Nonmetallic Priority Ratings

According to recent OPM reports mining enterprises (crushed-stone, sand-and-gravel, cement, lime, gypsum and other nonmetallic-mineral plants) have just been given an A-3 rating for "deliveries of essential machinery or equipment" by the issuance of an amended P-56 preference rating order dated December 2, 1941. This extends the A-3 rating to the purchase of new machinery and ties P-56 to P-23, which gave an A-3 rating to mining-machinery manufacturers.

Repairs for emergency break-down retain the A-1-a rating assigned by the original P-56 (dated September 17, 1941 and first amended September 22, 1941). Material required for "reasonable advance provisions to avert an actual break-down or suspension" have been given an A-1-c rating. Material needed for repairs to the "machinery and equipment" mentioned above have been given an A-3 rating.

The "machinery and equipment" to which the A-3 rating has just been given for purchases of new machinery as well as repairs includes all the equipment used in the operation, design, construction and erection of cleaning plants, concentrating plants, milling plants, preparation plants, and treating plants.

Missouri Plans $10,000,000 Road Program

Detailed plans calling for approximately $10,000,000 in federal funds for widening existing Missouri highways and constructing new ones are being prepared for presentation before the Roads Committee of the House of Representatives in congress soon, according to Robert B. Brooks, St. Louis member of the Missouri State Highway Commission.

"The expansion of Missouri's road facilities," Brooks said, "is made necessary by the construction of defense projects such as Fort Leonard Wood, the TNT plant at Weldon Springs, small arms plants at Lake City and St. Louis, and the expansion of Jefferson Barracks. A detailed schedule is now being drawn by the state highway department."

Brooks and Chief Engineer Carl W. Brown of the state highway department planned to go to Washington to appear at hearings on the $287,000,000 defense highway bill in behalf of the state program. One of the chief items on the state schedule is $2,300,000 earmarked for the construction of a 7.7 mile superhighway to Lambert-St. Louis Flying Field, the city's big municipal airport. Construction of this superhighway, terminating either at Lillian or Stratford Avenues on Goodfellow Boulevard, could be accomplished in lieu of the widening of Natural Bridge Road.

In addition to the new superhighway, the emergency schedule provides for the construction of a multiple lane concrete pavement on Highway 17 from Highway 66 into Fort Leonard Wood. Highway 66 would become a dual road divided by a parkway from Newburg to Waynesville.

The capacity of Highways 40 and 61 from the TNT plant at Weldon Springs to the Missouri River bridge would be doubled. A new road would be built as a substitute for Route 94, closed from the main TNT plant entrance four miles toward St. Charles. Lindbergh Road would be extended from Highway 61-67 to Jefferson Barracks, connecting with a

new bridge across the Mississippi River at that point. At Kansas City, a new road approach would be built to the small arms plant at Lake City.

"The $10,000,000 asked would cover only emergency needs," Brooks declared. "A full $42,000,000 would put Missouri highways in good condition for defense requirements," he added. "This amount would take care of all defense industry now contemplated within the state. Reports of new defense projects would create new highway problems that would have to be met."

Construction of the new roads, in addition to meeting a defense need, will help enormously to accommodate increasing traffic during normal years following the present emergency.

Transcontinental Highway Planned for Post-War Period

By Bethune Jones

Preliminary steps toward construction of a transcontinental superhighway, the 50 to 100 billion cost of which would be financed through toll-amortized bonds, were initiated at a conference November 15 in Atlantic City, New Jersey, attended by United States senators, representatives, road experts and business leaders.

The conference authorized appointment of a 10-member committee, headed by Paul B. Reinhold of Pittsburgh, first vice president of the American Road Builders Association, to outline future action, such as selection of the most advantageous route, proper legislation, financing and feeder highways.

The contemplated superhighway would be a post-war construction program to provide employment in the immediate period after the emergency and to serve as a great commercial link between the East and West.

Asserting that the proposed federal toll highway was "no silly dream," Walter A. Jones, chairman of the Pennsylvania Turnpike Commission, said the project could be financed by bonds sold to the public, with interest guaranteed by the federal government. Charges for use of road would retire the bonds, in the same manner as the system being used for the Pennsylvania Turnpike, he said.

"If handled the right way, the government would never be required to put up a nickel," Jones declared. "The public would absorb the bonds without use of the public treasury." He pointed out that the Pennsylvania Turnpike in its first year yielded $2,949,383 in tolls and $300,000 in concessions.

The proposed highway, Jones said, could be constructed so that emergency landing fields for airplanes could be built along it at regular intervals.

Proposed routes mentioned for the highway were from Boston to Seattle; Atlantic City to Philadelphia and thence utilizing the Pennsylvania Turnpike and continuing to San Francisco, and from Charleston, South Carolina, to Los Angeles. A central highway from Laredo, Texas, to Chicago also was suggested.

Model Used in Dam Experiment

In order to determine whether a dam and spillway long in operation in New Jersey can be utilized sucessfully as a measuring station to provide dependable data on stream flow, the Hydraulic Laboratory of the National Bureau of Standards, Department of Commerce, has reproduced a working model one-tenth the size of the actual structure.

The project was undertaken at the request of the United States Geological Survey, Department of the Interior.

In addition to determining whether the New Jersey structure is suitable for the use proposed by the Geological Survey, the Hydraulic Laboratory must determine the proper calibration for the station if the tests show that it can be so utilized.

The walls of the reservoir in the model structure are built of cement on the second floor of the Hydraulic Laboratory. Water is furnished to the reservoir by a pumping system and enters through a perforated brick inner wall on one side so that the surface of the water remains smooth. The dam is semicircular in form, made of copper and faced with wood. As the water reaches the top of the dam and overflows it swirls over an apron into the spillway. The spillway, in turn, empties into a catch basin or hopper attached to a standard scale. Readings of the weight of the water are taken at various flow levels. Readings are also made from a gauge set in the reservoir.

While the New Jersey dam is not considered the best type for use to measure stream flow, laboratory engineers are very hopeful that the tests will demonstrate that it can be adapted to that use.

The model structure will be adapted later for testing other types of dams and spillways, in connection with flood-control and water supply projects.

Nickel Production at New High

In a statement issued by The International Nickel Company of Canada, Limited, Robert C. Stanley, chairman and president, says:

"World nickel production and consumption in 1941 were at an all-time high. The sharp increase in demand arising from the joint British, Canadian and United States war effort required nickel production far beyond anything experienced in the past.

"The United States consumed over two-thirds of the world's total nickel output in 1941, as contrasted with an average annual consumption of about one-third during recent years. It is estimated that steel mills in the United States are currently consuming approximately 70% of the refined nickel imported into that country. Of the remaining 30%, foundries are taking 7.3%,

It's GOT what it TAKES
Brute ability that comes from putting weight where it does the most good — alloy steels where their wear resistance counts — good engineering where skimping would cut shop costs but shorten bucket life. A Haiss Bucket is tops, today — on performance. . . . Ask any contractor.
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Painting a "Cushion" on Open Gears

THE "CORRECT" ANSWER TO AN IMPORTANT PROBLEM IN VITAL DEFENSE PRODUCTION

Problem: The open gears at the right must be protected by a lubricant against wear due to: (1) Heavy or shock loads, (2) Dust and dirt in the air, (3) Presence of water.

The *correct* lubricant for this job must provide: (1) A tough film to prevent metal-to-metal contact, (2) A thin film to prevent accumulation of abrasives and packing of clearances, (3) A tough "waterproof" coating.

Answer: We have created a unique lubricant for this job — *Gargoyle Viscolite Fluid.* It can be applied by hand without heating, or be fed by mechanical devices. It is made with a quick-drying, non-inflammable diluent. As the diluent evaporates, a tough, black, thin skin is formed. *This film won't squeeze out or throw off!* As the film is thin, there is no opportunity to hold or pack dirt and dust. The tough coating sheds water like a duck. In many cases, Gargoyle Viscolite Fluid has helped reduce consumption more than 50%. This lubricant is available in four viscosities to fit every set of operating conditions.

TO HELP MAINTAIN CAPACITY PRODUCTION, CALL IN

SOCONY-VACUUM for "Correct Lubrication"

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• A Wisconsin highway department crew plants Virginia Creeper vines along the slopes of U. S. 12 in Eau Claire county.

brass mills 6.5%, heat resisting and electrical resistance alloys 4.6%, electroplaters 2.5%, and the balance is required for rolled nickel and high nickel alloys and a variety of other products.

"All mines and smelters of International Nickel operated at capacity throughout the year and the production rate has been raised in an endeavor to satisfy the unprecedented war-time demands for nickel. To increase its nickel production by 50,000,000 lbs. annually over its 1940 rate and thus make available a substantial additional supply, the Company has undertaken a production expansion program to be completed in 1943 involving an expenditure of approximately $35,000,000."

Pennsylvania Highway Maintenance Costs

While showing a slight increase over a year ago, the average cost per mile of maintenance on their state highway system for the fiscal year that closed May 31, 1941, was the second lowest in the last seven years according to the Pennsylvania Department of Highways.

During the last fiscal year the average cost for maintaining each mile of road on the system was $421. In the previous fiscal year the average cost per mile was $402.

The hard and severe weather prevailing during most of last winter was primarily responsible for the increase in maintenance costs, officials of the department declare. There was an increase of $9 a mile for the cost of snow removal. The total average cost for this item in the fiscal year was $115 a mile.

During the last fiscal year the department spent $4,640,624 on snow removal, an increase of $260,895 over the previous period. The snow removal program last winter covered 1,020 more miles than in the previous year.

Surface treatment as applied to the entire system in the fiscal year 1940-41 was $83 a mile, or $9 higher than the year before. The ever increasing mileage of low-type macadam roads on the system and the severity of the last winter also was responsible for this increase, according to engineers. Damage to the roads because of sudden freezes and thaws made increased expenditures for surface treatment necessary.

The average cost per mile of general maintenance was $219 during the fiscal year, an increase of only $2 a mile. The outlay for special repairs and flood repairs amounted to $4 a mile for the year.

Total expenditures of the department for all forms of maintenance in the fiscal year were $17,056,900. These expenditures went for general maintenance, surface treatment, snow removal, special and flood repairs. In the previous fiscal year the amount spent for all forms of maintenance was $16,296,510. For the fiscal year ending May 21, 1939, maintenance costs were $23,452,266.

During the year the department was responsible for the maintenance of 40,522 miles of highway and 17,299 bridges.—Pennsylvania Road Builder

Texas and Tennessee Remove Highway Barriers

Substantial progress toward uniformity of motor vehicle size and weight limits in harmony with recommendations of organized highway officials was made during the 1941 legislative year when 19 of 43 states having regular sessions changed their laws.

Texas abolished its former 7,000-pound load limit for motor vehicles in favor of scientific weight distribution with a maximum gross regulation of 38,000 pounds. The Tennessee gross weight limit for motor vehicles was raised from 24,000 to 30,000 pounds.

Statutes providing new weight limits also were adopted in California, Florida, Georgia, Indiana, Iowa, Maryland, New Hampshire, North Dakota, Ohio, Oregon, Vermont and Washington. These laws generally employ a maximum gross axle weight of 18,000 pounds as a standard. The American Association of State Highway Officials' bridge formula is utilized in new statutes in California, Georgia, Indiana, Maryland and Washington. Vermont substituted 600 pounds per inch of tire width for a 16,000-pound axle limit on motor vehicles.

The 1942 edition of "State Restrictions on Motor Vehicle Sizes and Weights" published by the National Highway Users Conference, is a compilation of these and all other new and existing state laws on this subject.

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Indian Warfare in the Modern Manner

(Continued from page 85)

ing a single 8-hour shift, the five scrapers moved 174,000 cubic yards at a final cost of 17c per cubic yard including all direct and indirect charges.

Side slopes were kept in shape as the excavation progressed by dressing them with bulldozer blades and a drag. Although the canal was dug alongside the river the machines did not strike water until the canal floor was from a few tenths to two feet from grade. This varied, of course, with the rise and fall of the Colorado River.

Near the upper end of the reservation where the administration buildings are located is the 420-foot tunnel, being drilled to carry the canal under the highway and railroad. The construction of this tunnel is one of the most important parts of the job, for it will be remembered that a similar undertaking resulted in disaster in 1872. But tunneling has progressed since then. This one incorporates progressive work methods, particularly in the forming and pouring of concrete. A heavy, horseshoe-shaped reinforced concrete wall ranging from 14 to 48 inches in thickness will carry this 1942 model Colorado River and prevent the tunnel from caving.

Temple Bar conglomerate, lake bed and tertiary sandstone are all found in the hill pierced by the tunnel. Some of the material was soft enough to cave, so heavy bracing and shoring had to be placed. Definite steps of construction are being followed under the supervision of Tunnel Excavation Foreman Elmer Detzman, who maintains logically enough that the proper timing of all interdependent phases is probably more essential in the tunnel than on any other part of the job.

A pilot cut is first made, removing the upper central part of the tunnel roof. Ingersoll-Rand, Sullivan, Chicago Pneumatic and Worthington pavement breakers with gads and spades are used. Necessary air is furnished by four Ingersoll-Rand 105 cfm compressors. When the pilot cut progresses four feet, work begins on the excavation of the rest of the roof. It is cut away, leaving an 18-inch berm chiseled in the rock three-fourths of the way up the tunnel on each side. Rough sawn 8" x 8" timbers, resting on this berm, are placed on 4-foot centers to form a strong top archway, bracing the tunnel roof against cave-ins.

A hole just wide enough to accommodate a dump truck is then broken out of the remaining block of material. This cut exposes the floor grade of the tunnel. Trucks are then loaded by backing them into the parking hole where material from the top sides, the pilot cut (which goes on ahead another four feet) and the overhang above the parking hole all falls down into the truck as it is dislodged. A portable platform is laid over

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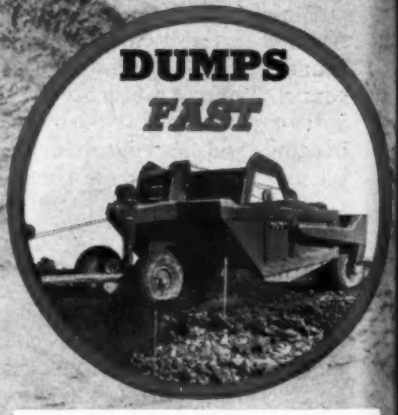
BLITZ buggies fo

Loading is accomplished in short distances with minimum drawbar pull. "Boiling action" breaks up the lumps as the dirt enters and puts a full uniform load into both bowl and apron.

No time is lost getting to the dump. These scrapers stay on top and keep rolling because weight is evenly balanced—there are no high deadweight superstructures. Unusual stability permits short, none-stop turns.



Dumps "on the run" and with tractor in the higher gears. Dirt rolls out easily by gravity as ejector is tilted to almost vertical position. Ejecting mechanism requires only a two-part line.

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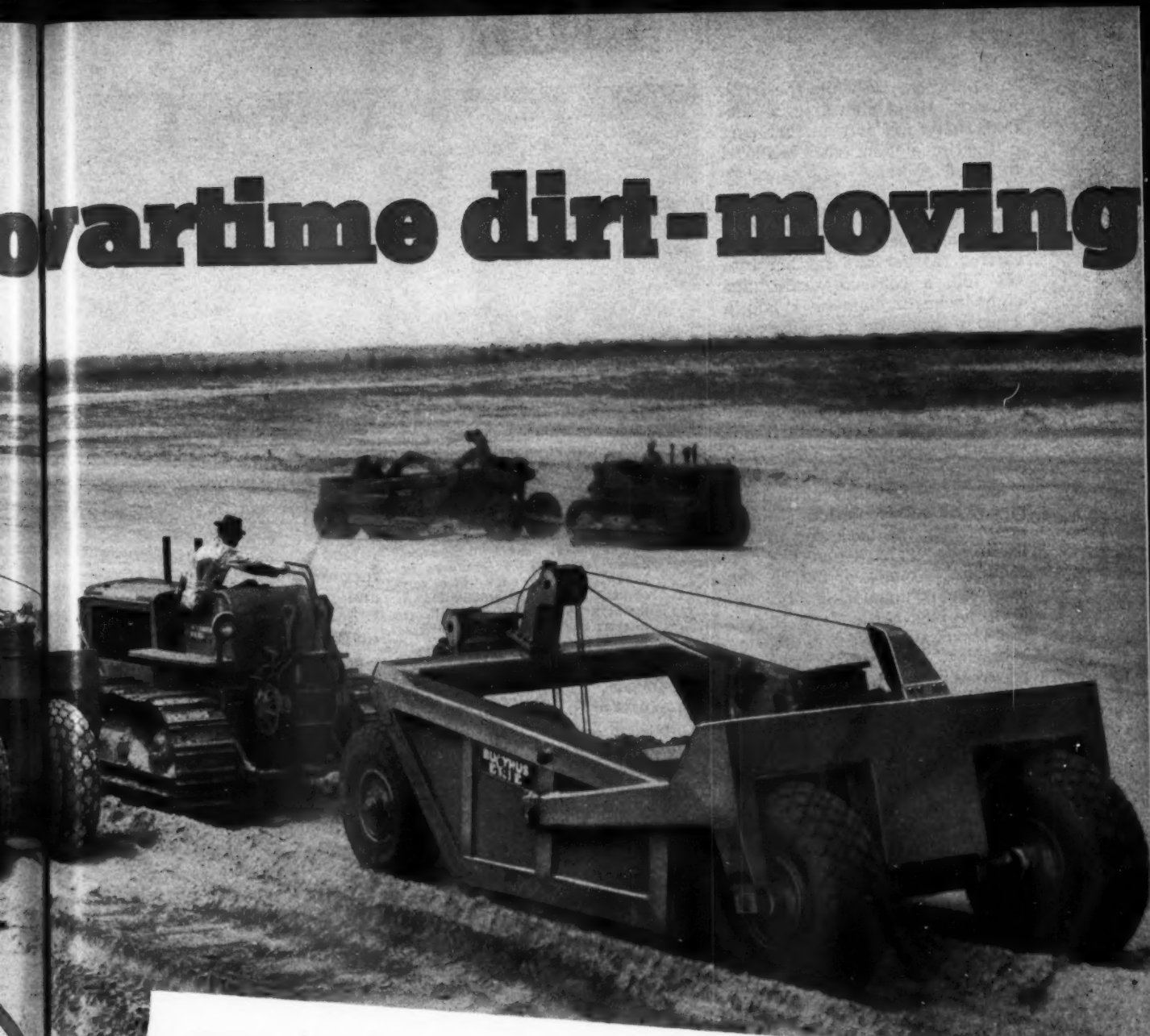


TOTAL war demands speed . . . and "speed" is the watchword as the basic industry of dirt moving plays its most important role. Dirt must be removed fast to produce more iron, coal and other raw materials, improve defense roads, enlarge airports, and double cantonment capacity.

Owners of Bucyrus-Erie 4 Wheel-Scrapers have come through with flying colors in stepping up their production to total war levels. To a great extent, this is due to the phenomenal speed of these units in digging, hauling, and dumping. But there are many other important reasons why these scrapers are famous:

They're strong and husky — built to "stand the gaff" of operating through three 8-hour shifts month after month. They have a reputation for obtaining heaping loads in the toughest materials without costly breakdowns and time losses. Operators like their easy maneuverability — their ability to dig, haul or dump on steep slopes without tipping. These scrapers also afford full visibility . . . the operator can see what he is doing at all times. Rope life is long because all rope is reeved in a straight line without damaging twists or side bends and with only a minimum of reverse bends.

Write for the complete story. Bucyrus-Erie Scrapers are manufactured in five sizes ranging from 4 to 13½ cubic yards struck capacity — Bucyrus-Erie Company, South Milwaukee, Wisconsin.

P127

NAL TRACTRACTOR DISTRIBUTOR

this parking hole while the truck unloads. Hand shoveling is limited, therefore, only to that part of the tunnel from truck bed level to the floor line.

Ground Water Drainage

As the truck parking hole is carried farther and farther into the hill, a concrete drain pipe eight inches in diameter is laid in a bed of gravel to carry off excess ground water. This pipe drains to a sump at the end of the bore, where water is removed by three Jaeger 40,000 gph pumps that handle the water removal without operating at capacity. The 4-inch compressed air line is also carried along in the gravel over the drain pipe, with service outlets stubbed up to clear the back end of the loading truck. A 4-foot block is completely removed before the next one is undertaken. In general, the pilot cut is about 16 feet in advance of the last excavation operation. The tunnel work is progressing at the rate of a foot every two hours.

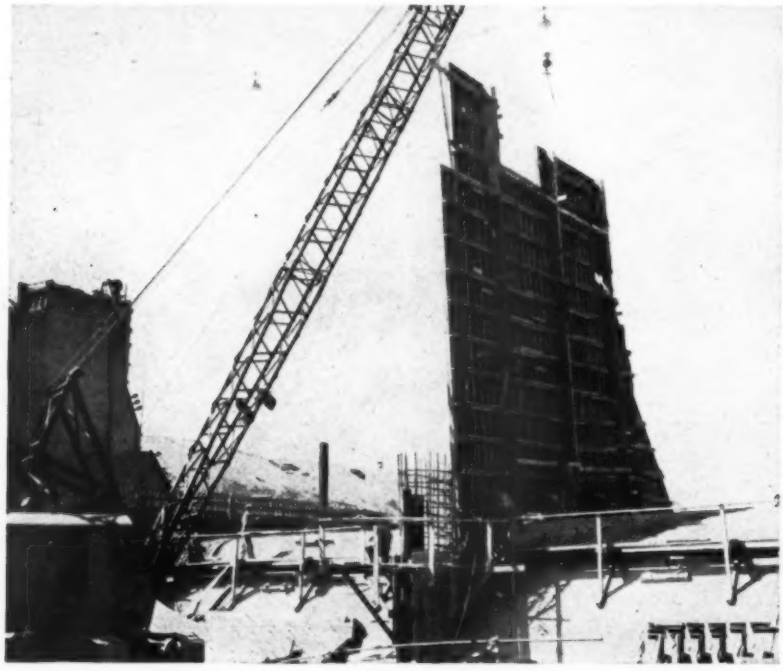
When the floor is fine graded a movable track is laid to carry the huge form which holds the concrete. This form, braced with heavy steel ribs, was made in the Indian workshop by Mojave Braves under D. B. Wallace, general foreman. Two of these forms are expected to last until the job is finished. The form is mounted on narrow gauge railroad wheels which roll along as the footing rail is advanced.

• The main canal excavation called for a cut 75 feet deep in heavy gravel material which was entirely handled by tractor drawn scrapers. Here two Allis-Chalmers tractors and a Bucyrus-Erie 13½-yard scraper pick up a load.

While this fine grading and track work is being done, steel reinforcement is placed from a jumbo extension fastened to the forward end of the concrete form and braced. The steel, all of which is on hand, incidentally, is in and tied by the time the Indian carpenters move the form ahead. Experience has taught these men that if the top of the arched form is set ¼-inch high, and the bases of the sides are set ⅜-inch wide, that the weight of the concrete will then spread the forms exactly to line and grade.

In stripping, the form collapses somewhat on hinges placed well toward the top. In setting, heavy spreader timbers are used at the base, with wedges. Stripping is usually done 24 hours after the pour.

In order to get the concrete inside the totally inclosed form, a hole 12 to 24 inches in diameter is drilled by a Star rotary drilling rig from the top of the hill down through the overburden into each monolith. An 8-inch "elephant truck" carries the Class A concrete down, and air hoses for the vibrators are also accommodated within the drill hole. Concrete is weighed out from a batching plant set up near the tunnel and serviced by an Allis-Chalmers "L" mounted bulldozer. This machine pushes the well graded gravel to a grizzly, where it falls through to power driven conveyors. Ultimately it passes



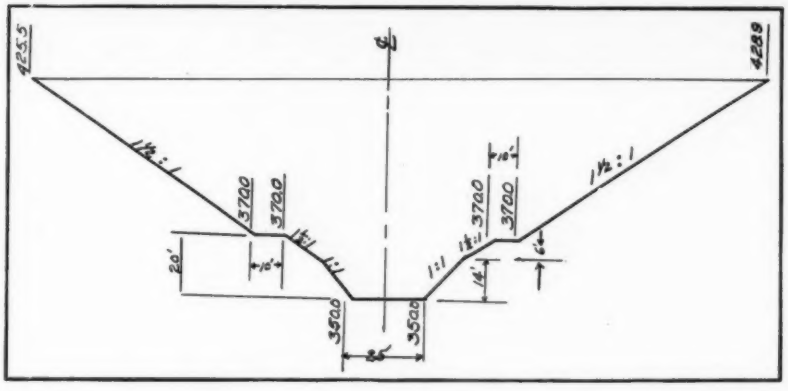
• A Northwest crane sets up bridge pier forms during the construction of Head Gate Rock Dam.

through different sized screens, finishing as a clean, well proportioned aggregate.

Placing Tunnel Lining

In making the concrete pours Mr. Wallace has shown remarkable generalship in the organization of his crew. It is a dangerous, disagreeable job at best for the vibrator men who have to literally wallow in the concrete as it reaches the top of the arch. Still, it was important that the tunnel walls be thoroughly consolidated so that patching would not be necessary when forms were stripped.

Using applied psychology, Foreman Wallace put an Indian boy on one side of the tunnel and a white boy on the other; impressed each one with the importance of thorough vibration. Maybe he also added separately to each of them that he hoped the Indian would do a better job than the white boy, or vice-versa. Rivalry sprang up so strong that there have been no rock pockets. The boys, when they fight, have to quarrel about nothing more serious than the usual water bubbles and air blisters. They smear themselves from head to foot with vaseline and stay in the forms until the concrete builds up almost to the top. They have to wriggle out on their stomachs. Pouring is done in two lifts, taking about six hours to place 50 cubic yards. The 8" x 8" timber braces are not removed. It is far safer to leave them in place and pour concrete up to them.



• Cross section sketch of the Colorado River Reservation canal cut. The canal follows a southerly course within a few hundred feet of and parallel to the Colorado River.

Thin sand-cement grout is run in the very top of the pour after the vibrator men get out. The concrete is poured with an average slump of four to five inches, and mixed in the ratio of six sacks of cement to a cubic yard of concrete. Constant surveying is necessary to keep the tunnel aligned and graded. The tunnel invert has a fall of .02 per hundred feet,

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"We have long since realized," writes A. J. Carlozzi, president of The City Excavating Co., Cleveland, Ohio, "that your 1/2 yard Multiple Rope Bucket gives us far better service than any other make previously used, and we have used several other makes of buckets."

Williams Buckets are truly "built to last and move dirt fast". Each type we build has numerous features which have been developed by over 35 years of bucket engineering for contractors, dredging companies and steel mills. Always a leader in welded design, Williams Buckets now feature welded construction at vital points, using rivets only at certain sections where ultimate replacement may be required. Make your next bucket a Williams!

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calling for very close work.

The machines on the job are all repaired and serviced in the main reservation machine shop, which works three shits six days per week. About 80 per cent of the work is done by Mojave, Pima and Yuma Indians. They live on the reservation in nice homes, and give one the impression that they have attained a high degree of self-sufficiency, with the help and guidance of their white fathers of the Indian Service.

The present job will tie directly into the existing 5,000 acre irrigation system by June, 1942, insuring adequate gravity flow from the Colorado to those acres and to others far thirstier. The work is being conducted under the general supervision of the director of the Office of Indian Affairs. On-the-job officials include H. V. Clotts, assistant director; R. H. Rupkey, project engineer, R. N. Parnell, associate engineer and Haywood Short, superintendent of construction. We are indebted to Mr. Parnell for an interesting historical and geological brief which proved most valuable in the preparation of this article.

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Sauerman Cableway digs gold tailings from dump-pile in gulch and conveys to bin alongside mill on hillside.

WHEREVER there is a problem of excavating from pit or bank, making long cuts and fills, handling blasted ore from open pit, stockpiling, or other work involving haulage for any distance from 100 to 1500 ft.—it pays to find out what a Sauerman Slackline or Drag Scraper will do and what it will cost. In a great many cases, a Sauerman machine shows a saving in comparison with any other equipment that will dig and haul an equal yardage.

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Colombia's Roads

(Continued from page 89)

will be widened to serve as a base for operations. Beyond the point of the railroad fill, the dragline will be placed on mats and work from the fill previously thrown up. It is estimated that it will require two years to complete this section.

At the present time it is not proposed to bridge the Dique, but a three-mile gap will be omitted and a ferry will serve to fill this gap. At a later date it is possible that this fill will be extended toward the center of the channel, at which time a bridge structure will be erected. The balance of the road is to be done with Bullgraders and scrapers, with the ½-yard shovel and trucks coming into play in rock cuts, etc.

It is estimated that it will take approximately three to three and one-half years to complete this section at the present schedule, but it is the hope of the contractor to increase the number of shifts as soon as his personnel is sufficiently trained to do so, thus materially reducing the time required. When this section is complete, Colombia's plans are to continue the highway from Carmen on south and connect with the present existing road north of Corozal. This section of the highway is under the direction of Dr. Carlos Nieto Latorre, engineer for the department government, and Dr. Manuel Castillo Blanco, Secretaria Obras Publicas, department of Bolivar, who have working under them a staff of civil engineers, many of whom were educated in the engineering field in the United States and who are applying methods of road construction similar to those used in the United States.

Ventura County

(Continued from page 87)

angle by the removal of a heavy pin on either side of the Bullgrader frame. With the blade angled to any position desired, it is easy to open up a cut on sloping ground, as on a hillside, for instance, with very little trouble. After a few seesaws a level spot was opened up for a working platform.

It was not desirable on this first clearing operation to remove anything other than the brush. The job was well scattered, and the two or three feet of earth overburden was needed in other parts of the job some distance away; too far away for transportation by the Bullgrader blade. While it is generally conceded that up to 200 feet a Bullgrader

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moves material cheaper than any other machine, the Portrero hauls were too great to make full use of this effectiveness. So the earth moving had to wait until some parts of the rock had been removed to make way for earth disposal.

Heavy parts of the cuts were broken down by using a 210 cubic foot Ingersoll Rand compressor and three Ingersoll Rand jackhammers. Holes, spaced at 5 foot centers, were put down as far as 20 feet through the shale to grade. After being sprung and shot down with 65% Hercules powder the rock was ready to be hauled out. About one pound of powder to each 2½ tons of rock gave satisfactory breakage and very little secondary shooting or "high bottom" was encountered.

Shovel, Truck Operations

The Moorpark district has a Bucyrus-Erie 10-B shovel that has seen many months of service in this same kind of material. By all the rules and regulations and the laws of common practice the West Portrero material was too tough for a machine of ⅜-yard size to dig. But it was brought in, nevertheless, to load out three Ford 5-yard dump trucks with Woods hoists. The little machine managed to keep up in good shape with only a very small amount of delay to operations for breakdowns or repairs. On average digging, the 10-B and three trucks moved 400 cubic yards per 8 hour shift.

This machine was also used to excavate the sandstone. Using special manganese steel teeth on the little dipper, the 10-B bit through cut after cut of this material without benefit of blasting to shatter this rock. By dispensing with the blasting operation the county was able to build the section of road well within the allotted estimate.

Following a general program, the excavated material was hauled an average distance of 1000 feet to the fill locations. The highway was built by dumping the large heavy rock from the blasted parts of the excavation into the lower portions of the fills. After a fill was once begun the rest was easy. The law of gravity was put to work for the county. It was natural in dumping off a pile for the larger rocks to roll to the bottom, with pieces of smaller size arranging themselves in a sequence more or less proportional to size. This resulted in a good even gradation of fill without bothering to sort anything up where the shovel was working.

Fills were kept level by the International-mounted Bucyrus-Erie Bullgrader. The sequence of construction was compact enough for the TD-14 machine to work both at stripping and leveling, making only a short run necessary between operations.

The entire job was conducted along this program. Laid out on a slope leading uphill toward the top of the mountains fringing Hidden Valley, the project was first opened up at the lower end, with the work progressing on toward the higher elevation. In this manner it was possible to work loaded equipment downhill and empty machines uphill. While the uphill grade was not especial-

EVERY ton of steel that can be diverted to the production of actual fighting instruments — planes, tanks, ships, guns — brings us closer to the day of Victory.

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For your convenience in writing to A. Leschen & Sons Rope Co., you will find a card bound in this issue.

"I don't know how this will work out as a road mix, but it certainly makes a good drink!"

ly great, Superintendent LeFever gave his machinery a rest by doing the job this way.

As soon as the rock fill was laid and leveled, earth moving operations were started. The International TD-14 was hooked on to a new Bucyrus-Erie Model S-67 four-wheeled scraper and put to work digging the earth overburden. The S-67 scraper is a 6 cubic yard struck measure capacity machine and holds 7½ cubic yards when heaped. It is cable controlled, in this case by a Bucyrus-Erie Model P-24 double drum power control unit. The P-24, giving 4500 pounds of line pull at the winch, was purchased with the tractor.

There was a great deal of doubt in the minds of some of the old timers regarding the successful application of a scraper to this job. County roads in Ventura County are seldom more than 25 feet wide. Working downhill along this road where one side of the right-of-way fronted a cultivated field and where the other side gouged into a cliff, many of the men believed it would be impossible to turn the machine around after it had dumped its load; at least not without a great deal of jockeying around. To some of them used to a truck-shovel combination the idea of a scraper was not so good.

Scraper Used Successfully

But the machine surprised everybody by turning freely without stopping in the 25-foot roadway. This was an extremely short radius turn, but the ability of the scraper to follow the TD-14 faithfully relieved everyone of a headache. The earth being excavated consisted mainly of a damp clay with some admixture of silt. Loading downhill in low gear, the International TD-14 put slightly more than five tons of drawbar pull on the scraper to load it full in a distance of about 125 feet. While the double curved edge of the cutting blade was designed to dig as deep as 10 inches, it was found best in the damp clay to skin a layer about half that deep off the top. This resulted in better pulverizing of the material, less voids, and it helped the "boiling" action of the scraper to produce a nearer to heaping capacity load than would normally be the case if the tractor operator were not so skilled.

Hauls were kept to 500 feet on an average and working at this distance accounted for about 50 cubic yards per hour on the fill. It didn't take many days like this to finish up the dirt moving schedule. Topping out with a gravel and plant mix top coat completed the road.

The Moorpark district, under Supervisor LeFever is one of five similar districts in Ventura County. While each district is headed by a supervisor, the close touch each district maintains with the central headquarters at Ventura has resulted in a standardized, well organized program.

Equipment used is bought for long, hard service and is well cared for in a central yard and shop in each of the districts. Repairs were made to the machinery on the Portrero job in the yard at Moorpark.

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Notes from the manufacturers

Timken Roller Bearing Company, Canton, Ohio, has announced the appointment of Dwight A. Bessmer to the position of assistant director of purchases. Mr. Bessmer joined the Timken Company shortly after his graduation from Michigan School of Mines in 1929. He served as automotive sales engineer in the Detroit territory for six years. He entered the purchasing department as a buyer eighteen months prior to his recent appointment. The company also announces the transfer of F. H. Lindus to sales promotion work located at Canton, Ohio. He will contact users of bearings regarding mutual sales and merchandising problems. Mr. Lindus has been with the Timken Company since 1935 serving as Los Angeles branch manager of the service division until he was transferred to the main office at Canton a few months ago.

The American Society of Mechanical Engineers, Finance Committee announced the election of K. W. Jappe, director of purchases of Hercules Powder Company, Wilmington, Delaware, as chairman of the committee.

Wickwire Spencer Steel Company, 500 5th Avenue, New York, New York, announces the election of Dean Rollans as vice president in charge of sales and the appointment of William H. Husted as assistant to the president. In addition to his regular duties, Mr. Husted will be given leave of absence for three days a week to serve as consultant to Raw Materials Division of OPM.

John A. Roebling's Sons Company, Trenton, New Jersey, according to an announcement by C. G. Williams, executive vice president, has appointed Bert M. Brock as manager of industrial relations. Mr. Brock for the past year has been Director of Public Relations, Pittsburgh Division, Carnegie Illinois Steel Corporation.

Chicago Pneumatic Tool Company announces the appointment of J. Rogers Davis as supervisor of branches, according to H. Arnold Jackson, president of the company. Mr. Davis joined the company in December and will assist in the sales activities of the company's 21 District and Sub-District offices. He will standardize sale office procedure and coordinate sales plans and quotas with branch and divisions managers.

B. F. Goodrich Company, Akron, Ohio, has announced the appointment of William S. Richardson as general manager of mechanical goods and sundries sales according to John L. Collyer, president of the company. Mr. Collyer also announces that Dr. Howard E. Fritz, manager of the synthetic division of the company for the past seven years and one of the best known technical men in the rubber industry, has been named director of research. Dr. Fritz came to the Goodrich Company in 1925 from the engineering school faculty of Ohio State University. Dr. Fritz succeeds James W. Schade, research director since 1925, who has announced his retirement.

John A. Roebling's Sons Company, Trenton, New Jersey, have announced the retirement of Raymond R. Newell as manager of their Cleveland, Ohio, branch. Mr. Newell was associated with the company for 39 years and had charge of the Cleveland organization since 1911. Eugene King, former assistant manager, has been appointed as manager succeeding Mr. Newell. He has been with the company since 1917.

Worthington Pump and Machinery Corporation, Harrison, New Jersey, announces the election of John M. Franklin, president of International Mercantile Marine Company and

Separating
THE MEN
FROM THE BOYS

GATKE Moulded Brake Blocks and Frictions are made to fit all makes of Shovels, Drag Lines, Cranes, Hoists, Dredges, etc.

TOUGH jobs quickly show whether Brake Lining and Frictions can take it. That's why Engineers and Operators from coast to coast come to GATKE when ordinary materials fail.

Why not use GATKE High-Heat-Resisting Asbestos Materials for every brake and clutch? Then you'll be set for tough jobs. You'll get better performance, longer service, fewer adjustments and reduced maintenance expense under all conditions.

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OTHER PRODUCTS MADE BY GATKE

Brake Lining and Clutch Facings for all applications.
Brake Blocks and Liners for Trucks, Tractors and Trailers.
Non-Metallic Bearings.
Non-Metallic Gears.
Non-Metallic Pump Valves and Piston Rings.
Asbestos Cloth, Tape, Wick.
Compressed Sheet Packing.

GATKE CORPORATION
232 N. La Salle St. Chicago, Ill.

For your convenience in writing to Gatke Corporation, you will find a card bound in this issue.

president of United States Lines Company to the board of directors of the Worthington Pump and Machinery Corporation. Mr. Franklin is also a director of Pan-American Airways, and a trustee of Atlantic Mutual Insurance Company. The company also announces the appointment of George P. Passmore as works manager in charge of manufacturing of its Wellsville works. Until recently Mr. Passmore has been manager of manufacturing of the South Philadelphia works of the Westinghouse Electric and Manufacturing Company, having been connected with the Westinghouse organization for 20 years in various capacities.

New trade literature

Title: "Practical Arc Welding"

Subject: A handbook of practical arc-welding has been written to fill a great need due to the sudden acceleration of welding activities and the increased demand for trained welding personnel. Even experienced welders have found they must keep abreast of modern methods at all times, which, it is believed, are covered completely in this book. The book covers the growth of arc welding; where it may be used; discussions of joints and welds and a complete series of arc welding lessons exactly as they are offered in a famous trade school. The latter part of the handbook contains a complete dictionary of welding terms and 20 pages of helpful data for operators and designers. The book is profusely illustrated with large and full page photographs.

Where to Get: Hobart Trade School, Inc., Box EW 80, Troy, Ohio. Price $2.00.

Title: "The New '99-M"

Subject: An interesting 8-page bulletin describing the new 99-M Austin-Western power grader. Explains various applications of the grader to different jobs. The booklet also gives brief specifications and illustrates attachments and their uses.

Where to Get: The Austin-Western Road Machinery Co., Aurora, Illinois. Free upon request.

Title: "Koehring Unibatch Paver"

Subject: A two-color, twelve-page bulletin describing the new Koehring 34-E Unibatch paver. Close-ups of mechancial details and specifications are included in the well-illustrated booklet.

Where to Get: Koehring Company, 3026 W. Concordia Ave., Milwaukee, Wis. Free upon request.

Title: "Win Against Winter!"

Subject: A new booklet on snow removal, 8 pages in two colors describes in detail the various models of snow plows manufactured for use with "Caterpillar" tractors. The bulletin is filled with illustrations showing the equipment at work in the field.

Where to Get: LaPlant-Choate Manufacturing Co., Inc., Cedar Rapids, Iowa.

Title: "They Wrote A Letter"

Subject: A 12-page booklet replete with copies of testimonial letters and photographs of owners and their equipment.

Where to Get: Caterpillar Tractor Company, Peoria, Illinois. Free upon request; ask for Form 6913.

Title: "Index of Quarterly Digests"

Subject: An index to the twelve issues of its Quarterly Digest of Current Asphalt Literature, published by the Asphalt Institute. The index is planned to serve as a quick reference to all the articles relating to asphalt that have appeared in the leading Technical Magazines during the past 3 years.

Where to Get: The Asphalt Institute, 801 2nd Avenue, New York City. Free upon request.

Title: "Thor Tool Catalog No. 37"

Subject: The complete 1942 line of Thor tools is described in this attractive new 64 page catalog. Containing four

BECO
HYDRAULIC PRESS
BUCYRUS ERIE
SMALL and PORTABLE
100 TONS of POWER and UP
For use as PULLER - PRESS - or JACK to save you time and money in dismantling worn-out or broken-down equipment and in reassembling machine parts right in the field. Saves time, too, on other types of lift, pull, or press work.
Manufactured in 100, 150 and 225 ton sizes, the BECO Press can be quickly seperated into hand portable units and transported out on the job as well as used in machine-shop repair work.
T-24
Bucyrus·Erie
SOUTH MILWAUKEE, WISCONSIN

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major sections, the book, known as Catalog No. 37, gives complete descriptions, specifications and prices on universal type electric drills, drill stands, screw drivers, nut setters, tappers, saws, hammers, nibblers, grinders, sanders, polishers and electric tool accessories. Printed in two colors and profusely illustrated with photographs of tools in operation on various types of work, the book is a helpful guide.

Where to Get: Independent Pneumatic Tool Co., 600 W. Jackson Blvd., Chicago, Ill. Free upon request.

Title: **"Banish Old Man Wet"**

Subject: A new bulletin describing various rubber base compounds which are designed to stop leaks or seepage through brick, concrete, stucco or other types of masonry.

Where to Get: Primoid Products Corporation, 103 Park Avenue, New York, N. Y. Free upon request.

Title: **"Thor Rock Drills, etc."**

Subject: A two color catalog containing 68 pages of pneumatic equipment and specifications. Large, clear illustrations and short to-the-point copy makes this a valuable addition to the industrial library of any person using pneumatic tools.

Where to Get: Independent Pneumatic Tool Company, 600 West Jackson Blvd., Chicago, Illinois. Free upon request.

Title: **"How To File Your Income Tax Return The Simple Way"**

Subject: A folder explaining how to file the new simple income tax return. It contains a facsimile of the simplified Form 1040A and illustrates the six steps required to prepare the return. Form 1040A may be used by persons who are required to file returns but have gross incomes of not more than $3,000 from salaries, wages, etc. The last page of the folder contains a table showing the individual income tax on 1941 net income based on the old tax form.

Where to Get: Nearest Collector of Internal Revenue. Free upon request.

Title: **"R-B Power Finegraders"**

Subject: A new illustrated bulletin describing Buckeye R-B power finegraders for road and airport runway construction. New design features are discussed including the new tandem form wheels, hydraulic lifts, heaver frames, etc. Specifications are given on two models.

Where to Get: Buckeye Traction Ditcher Company, Findlay, Ohio. Free upon request.

Title: **"Pomona Industrial Pumps"**

Subject: A new industrial catalog containing practical information concerning pump adaptation for a wide range of duties under varying conditions. The brochure contains not only a profusion of illustrated case histories of varied applications, but also presents many practical drawings for laying in this type of pump.

Where to Get: Pomona Pump Company, 206 E. Commercial Street, Pomona, California. Free upon request.

POSITIONS WANTED

Address all box numbers c/o EXCAVATING ENGINEER South Milwaukee, Wis.

ALL AROUND OPERATOR—Shovel, crane or dragline operator. Can also handle job as foreman over heavy equipment. 25 years experience on diesel, gasoline, steam and electric. Can overhaul and repair all makes of machinery. Have worked on roads, bridges, dams, docks and canals. Worked in Panama 11 months for U. S. Gov't. Go to any country that pays with U. S. money. Prefer work in the United States for a good company on 3-yard shovels or larger. Best of references furnished. Married, sober and reliable. Located Wisconsin. Box 9185

OPERATOR

Wanted—Steady work for good operator—20 years experience—steam, gas, diesel shovels—draglines, clamshells. Quarry, gravel pits, coal stripping. Lots of highway work. Can operate all makes of machines, maintain any kind. Fast operator—go any place in U.S.A. Age 47, no booze—married—start work at once. Joe Paulson, Box 130, Tamms, Illinois.

EXPERIENCED OPERATOR—Familiar with the American Locomotive, American Gopher, Link Belt Speeder and Bucyrus-Erie machines. Can operate cranes, shovels, magnets and draglines. Married, with family. Willing to go anywhere for steady work. Box 2186

DRILLING WORK WANTED—10 years experience well drilling also blast hole work—have drilled in all types of rock—solid and broken. Have also done proving. Married. Will go anywhere. Frank Breankach, 518 Chicago Street, Joliet, Illinois.

HELP WANTED

Sales Engineer — Experienced in layout and estimating of conveying equipment as used by contractors in handling of sand, gravel and other materials. Sales experience desired. Barber-Greene Company, Aurora, Ill.

BARGAINS IN USED EQUIPMENT

FOR SALE, RENTALS, BUSINESS OPPORTUNITIES, TRADES, ETC.

To the reader wishing to advertise used equipment in the "For Sale" Section: All advertising in this section is payable in advance. Enclose your check or money order with copy. Rate: 60c per line. Minimum charge $2.40. No discounts; no commissions. If no change in copy is desired, three continuous insertions are offered for the price of two. Read these instructions carefully. Each line contains 41 characters (34 characters if all capital letters are used). Count spaces and punctuation as one character each. Allow 10 characters for box number, if blind advertisement is desired. Count your own copy to save delay. Holding up your advertisement one month to secure approval of revised copy or an additional remittance may cost you real money in a lost sale. Be sure to enclose the correct amount of money with your order. Closing date—15th of preceding month. Example: January issue closes December 15th.

To the reader wishing to answer "For Sale" Section advertisements appearing on these pages: Be sure to address your inquiry to the advertiser by using the correct box number. Mail your letter in care of Excavating Engineer, South Milwaukee, Wisconsin. Write each advertiser a separate letter. Do not write us for name and address of advertiser. This information will not be given out. We have no information about the equipment advertised other than that shown in the advertisements themselves.

SMALL SHOVELS, CRANES AND DRAGLINES

Up to 2½ Cubic Yards

INSLEY MODEL R ½-yard gas shovel, dragline and clamshell. Engine completely overhauled. Good as new. Balance machine thoroughly field checked—some new parts added. Located Indiana. Box 2783

OSGOOD CRANE 65' boom, ⅞-yard digging bucket, self starter, excellent general condition. Rent monthly $350. Sale $3,000. Location, New York. Box 2858

MARION MODEL 37 steam shovel crawler mounting, 32' boom also 50' crane boom and clamshell bucket. Steel cab, good condition, central location. Box 2836

BUCYRUS 50-B STEAM Shovel No. 4221. Caterpillar mounting, 17' dipper handle, 2 cu. yd. dipper. In good condition. Located in Eastern Ohio.

The Warner Collieries Co.
570 Union Commerce Building
Cleveland, Ohio

FOR SALE

1 Bucyrus-Erie 43-B 1¾ cu. yd. shovel operated by Buda Lanova diesel engine. Excellent condition.
1 Marion Model 361 shovel equipped as standard shovel with 1½ cu. yd. bucket operated by Buda JV6L gasoline engine with electric starting equipment.
1 P&H model 650 shovel, 1¼ yd. machine with Waukesha gasoline engine. Exceptionally good condition. Box 2846

BARGAINS IN USED SHOVELS

1 Northwest Model 25 standard shovel, operated by 6 cylinder 4¼ by 5" Wisconsin gasoline engine with electric starter, 24" alloy treads. Purchased new Dec. 1st, 1939. Includes 55' clamshell attachment (no bucket).
1 Bucyrus-Erie 43-B standard shovel with 1¾ cu. yd. bucket insert teeth and operated by Wisconsin gasoline engine. Machine in good operating condition.
1 P&H Model 700 shovel equipped as standard shovel with 1½ cu. yd. bucket operated by Wisconsin gasoline engine. Good condition.
1 Bucyrus-Erie steam shovel equipped as standard shovel. Good condition.
1 Michigan model No. T6 truck shovel operated by Hercules engine JXC551248 complete with shovel and crane attachment with bucket. Box 2846

BUCYRUS-ERIE GA-2 gas-air shovel equipped with 24' boom, 18'4" dipper handle, 1¼-yd. dipper, chain drive caterpillar, and powered with Waukesha 4 cylinder WS gasoline engine. Located in Washington, D. C. Box 2861

LARGE SHOVELS, CRANES AND DRAGLINES

2½ Cubic Yards and Over

FOR SALE—Available immediately—One Marion Model 5480 shovel, located in southern Illinois; equipped with 90' boom, 64' handle and 5 cu. yd. BECO dipper; maximum dumping height 68'; arranged for a power supply of 3 phase, 60 cycle, 4000 volts; requires 25 cars for shipping. Box 2860

BUCYRUS-MONIGHAN 4-W Diesel Dragline. 110' Boom. 4½-yd. Bucket. Reported good working condition. Some extra parts included. Located Georgia. Box 2796

If You Do Not Find What You Want Listed—Write Us

EXCAVATING engineer
South Milwaukee, Wisconsin

FOR SALE

MARION MODEL 125 electric shovel, crawler mounted, 55' boom, 36' handle, 2½-yard bucket. For power supply 3 phase, 60 cycle, 2300 volts. Box 2854

SHOVEL

6 YD. 200-B Bucyrus-Erie Stripping Shovel.

DRAGLINES

7 MONIGHAN 3-W, 4-W, 5-W and 6-W Diesel walkers.
2 43-B and 48-B Diesel Cats.

TIDEWATER EQUIPMENT & MACHY. CORP.
305 Madison Avenue, New York, N. Y.

BUCYRUS-ERIE MODEL 1030. Gasoline, Clamshell. 50 ft. boom, ¾-yard Owen Digging Bucket. Also Dragshovel equipment. Good operating condition. Working every day. Located Detroit. Box 2768

CLASS 14 Steam Dragline No. 3562 with 70' boom and 2-yard Page dragline bucket said to be in good running condition, immediately available, centrally located. Box 2847

BUCYRUS-ERIE 55-B Diesel Dragline. 75'-0" Boom. Oversize Cats. Atlas engine. Now operating Kansas. Box 2766

BUCYRUS-MONIGHAN 3-W Diesel Dragline. 100 ft. Boom. One 2¼-yd. AX Drag Bucket and one 3-yd. AUX Drag Bucket. Operated less than twelve months total time. Located South Dakota. Box 2767

MISCELLANEOUS EQUIPMENT

FOR SALE

TIRES—SIX 32 x 6 8-PLY 20" RIM. EIGHT 42 x 9 12-PLY 24" RIM. USED SIX WEEKS. SHUNK MFG. CO., DEPT. EE, BUCYRUS, OHIO.

2 YD. SLACKLINE outfit complete, in excellent condition. Consisting of 100 H.P.G.E. variable speed hoist motor, two speed hoist, 80' all steel mast, one two yard bucket, one 1¼ yd. bucket.

R. W. Robinson
P. O. Box 603 **Austin, Texas**

10-B SHOVEL attachment only. Cat. 50 Diesel, 50 gas wide gauge, 35 gas, 60 gas, International TA-40 TracTracTor. 18 Fresnos 42 inch. No. 7½ Wonder Mixer. Cat. No. 10 Auto Patrol. Clifford Waterhouse, Jackson, Mississippi.

COMPLETE STRING of Star tools for sale, consisting of 14' stem 2¼x3¼ joint, collar 4½ sq. 3½ rope socket. Wrenches, 10" spudding bit. 5' drilling jars. 4½x12 D. V. bailer. 5½x7 Morahan Vac. bailer, 10' drive head, these tools have done less than 300 ft. of hole. Box 2859

Engine

For Sale at Bargain Price

1 Used "Waukesha-Hesselman," Oil engine, Serial No. 371416 Model XBKH, 4-cylinder, 3¾"x4¾", 20 H.P. at 900 RPM (run only 100 hours for test machine), at South Milwaukee, Wis.

Write — Wire — Telephone

BUCYRUS-ERIE COMPANY
PARTS DEPARTMENT
SOUTH MILWAUKEE, WIS.

FOR SALE OR RENT

6 ATHEY 16 cu. yd. Model FB32 2-way dump trailers on 30 ton tracks; 2 Model D-8 Caterpillar tractors. Michael Pontarelli & Sons, 4248 N. Kilpatrick Avenue, Chicago, Ill.

FOR SALE

1 P&H 700B shovel attachment with 1¼ cu. yd. manganese front bucket. Good condition.
1 Williams General Purpose clamshell bucket, 1 yd. capacity complete with teeth.
1 Unit No. 15 dragline shovel attachment for 10-B Bucyrus-Erie machine. New.
1 Unit No. 3 clamshell attachment with 28' boom for Bucyrus-Erie 10-B shovel. New.
1 P&H 300B trench hoe attachment. Good condition.
1 Warrington Vulcan No. 1 pile hammer with standard base, steel ram.
1 LaCrosse KU6-18 Ton pneumatic tired trailer. 8'x14' platform. Used only 6 times. Box 2856

FOR TRADE

HEAVY DUTY 1½-yard clam bucket now working, for 1½-yard orange peel bucket in good condition. Central Coal Company, Madison, Indiana.

DELIVERY FROM STOCK
DRAGLINE BUCKETS

New and Rebuilt, sizes from 1¼ to 2½ cubic yard. Priced for quick sale, Bargains

Investigate NOW.

THE WELLMAN ENGINEERING CO.
CLEVELAND, OHIO

If You Do Not Find What You Want Listed — Write Us

EXCAVATING engineer
South Milwaukee, Wis.

Car Transporter

STACKER TYPE MACHINE consisting of self-propelled caterpillar mounted, inclined bridge on which 3-cubic yard material transporting car travels and dumps automatically at a distance approximately 145' horizontally and 80' vertically from loading point. Machine in good condition and priced to sell. Operates on 60-cycle, 3-phase, 2300 volts. Further information on request. Box 2772

BOILER at slashed price. Locomotive type, 75 h.p. under forced draft, 40 h.p. natural draft, 44"x17' 125 lb. working pressure A.S.M.E. Std. Will fit 68-C shovel. Surplus stock. Good as new. Why pay more if this bargain will make money for you? Offered subject to prior sale.
Write—Wire—Telephone

BUCYRUS-ERIE COMPANY
PARTS DEPARTMENT
SOUTH MILWAUKEE, WIS.

FOR SALE

1 27E Rex paver, 1 8 ton roller, 1 Gardner Denver air compressor, 1 Cletrac 55 tractor bulldozer, 1 Gar-Wood & 1 Isaacson bulldozer attachments. Sols, 95 Flat Shoals Ave., Atlanta, Georgia.

FOR SALE—75' boom, 52' handle, 3 yard dipper steam stripping shovel mounted on 4-wheel equalized trucks reasonably priced central location. Box 2840

27'6" boom, 18' dipper handle, 2¼ yd. rock type dipper. Also auxiliaries for 52-B diesel shovel service. Used less than 6 months. Box 2839

Need a Dragline Bucket?

Here are three new and three used Dragline buckets—offered at bargain prices.

ONE ⅝-AX Beco Rebuilt, 1,600 lbs.
TWO 2 yd. Beco AU, 3,300 lbs. New.
ONE 3½ yd. Beco AU-AX 6,400 lbs. Used.
ONE 4 yd. Beco Y, 11,500 lbs. Used.
ONE 7 yd. Monighan W, 13,700 lbs. New.

Money savers for you. New and rebuilt equipment carries new machine guarantee.

Write — Wire — Telephone

BUCYRUS-ERIE COMPANY
PARTS DEPARTMENT
SOUTH MILWAUKEE, WIS.

WANTED

WANTED: Used pull shovel attachment for Koehring 301. Give full particulars. Willy Boutin, 4233 Bannantyne Ave., Verdun, P. Q., Canada.

WANTED—To rent or lease—Dragline 2½ or 3-yard minimum 75' boom. Gasoline or diesel operated. For small stripping operation. Must be in good condition. Should be located in East. Box 2857

WANTED—Two Gasoline or Diesel Draglines, Monighan and Bucyrus 45-B or larger. 25 to 35 ton standard gauge locomotive.

MONTEZUMA GRAVEL COMPANY
Box 144 Terre Haute, Ind.

WANT TO BUY—1000 or 1500 ft. Air Compressor. 2 to 4-yd. Diesel or Electric Shovel. 25 Ton or heavier Locomotive Crane. 5 or 6-yd. Dragline. 10-B ⅝-yard Gas Shovel.

RUSSELL STANHOPE
60 E. 42nd St. New York, N. Y.